

Lincoln University Digital Thesis

Copyright Statement

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

This thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- you will use the copy only for the purposes of research or private study
- you will recognise the author's right to be identified as the author of the thesis and due acknowledgement will be made to the author where appropriate
- you will obtain the author's permission before publishing any material from the thesis.

**Whole farm assurance programmes as a means to achieving
best practice dairy farming: A case study of the Synlait Milk
Ltd Lead With Pride Programme**

A Thesis
submitted in partial fulfilment
of the requirements for the Degree of
Master of Applied Science
at
Lincoln University
by
Ryan MacArthur

Lincoln University
2019

Abstract of a Thesis submitted in partial fulfilment of the
requirements for the Degree of Master of Applied Science.

**Whole farm assurance programmes as a means to achieving best practice dairy
farming: A case study of the Synlait Milk Ltd Lead With Pride Programme**

by

Ryan MacArthur

Best management practice (BMP) is seen as a way of facilitating a synergy between productive and sustainable farming systems within the dairy industry. Driving the adoption of programmes that implement BMPs may help to address a number of issues surrounding the dairy industry and the change associated perceptions these issues create. Understanding the adoption behaviours of farmers could help increase the uptake of programmes.

Synlait Milk Ltd Lead With Pride™ (LWP) programme seeks to demonstrate industry leadership on food safety and sustainability by recognizing and financially rewarding suppliers who achieve dairy farming best practice. The ISO/IEC 17065 accredited whole farm assurance scheme follows a four-pillar approach focusing on environment, animal health and welfare, milk quality and social responsibility, with each certified supplier independently audited.

A qualitative study was conducted to understand the adoption drivers and motivations amongst farmer suppliers and to determine the financial value returned to farmers. Thirteen semi structured interviews were conducted with both certified and non-certified suppliers to understand their perceptions and motivations, which were analysed utilising the theory of planned behaviour framework. Three case study farms provided financial data to conduct an analysis of the potential profitability of programme participation to understand if implementation of BMP programmes may lead to financial benefits.

The research identified perceived relative advantage, compatibility and complexity as the dominant factors influencing suppliers' behaviour regarding adoption. Key factors influencing adoption (both positively and negatively) were the premium on offer for the milk

supplied, the exposure to new social responsibility requirements and the importance of the support of extension services through the certification process. In addition, the fact that farmers participated in the programme's development was also seen as an important influence on adoption. The findings also revealed that an extension can be made to the model presented by Reimer, Weinkauf, and Prokopy (2012), highlighting the consideration that suppliers gave to the future implications of adoption. Findings from the research concluded that adoption of BMP through LWP could allow for enhanced profitability for the average Synlait supply farm, predominately attributable to changes within animal health and welfare practices. However, the extent to which a farm may financially benefit from adoption of the programme will vary, as this depends upon the practices that were in place prior to adoption.

Findings from the research provide evidence that adoption of BMP within intensive farming operations can drive profitability and ensure sustainability within New Zealand's dairy industry.

Keywords: farm assurance, best practice management, Synlait, Lead With Pride, adoption, financial

Acknowledgements

I would like to express my appreciation to all those who supported me and contributed to making this thesis possible. I am extremely grateful for the guidance, perseverance and wisdom of my supervisors Professor Alan Renwick and co-supervisor Dr. Kevin Old. I am thankful to them for their willingness to answer questions and review work without any hesitation.

Thanks to the support of the Synlait Milk Ltd Milk Supply Team for providing the required data and knowledge related to the research. In particular thanks to Mark Wren for his patience and expertise, without which I would not have been able to complete this project.

Thanks to my family, in particular my parents Peter and Lynley for their constant ongoing support. Thanks must also go to all my friends, classmates and flat mates who expressed interest in my research, put up with endless discussions and questioning and continually provided support.

Lastly, thanks is owed to the AgriOne Centre of Excellence in Farm Business Management for their support and the Lincoln University Future Leaders Scholarship for their financial support which enabled me to complete my studies.

Table of Contents

Abstract.....	i
Acknowledgements.....	iii
List of Tables.....	vi
List of Figures.....	vii
Chapter 1 Introduction.....	1
1.1 Research Background.....	1
1.1.1 New Zealand's Dairy Industry	1
1.1.2 Agricultural Intensification.....	2
1.1.3 Addressing Intensification.....	3
1.1.4 Managing Intensification in New Zealand's Agricultural Industries	4
1.2 Problem Statement.....	6
1.3 Research Motivation	7
1.4 Thesis Structure	7
Chapter 2 Literature Review	8
2.1 Farm Assurance Schemes	8
2.1.1 Whole Farm Approach to Quality Assurance.....	9
2.1.2 Farm Assurance Scheme Adoption Drivers.....	10
2.1.3 Types of Farm Assurance Schemes	13
2.1.4 Best Management Practice	14
2.2 Farm Assurance Scheme Motivations and Perceived Benefits.....	16
2.3 Adoption Theories and Frameworks.....	18
2.3.1 Diffusion of Innovation	18
2.3.2 Theory of Planned Behaviour/ Reasoned Action Approach	20
2.4 Literature Gap	22
Chapter 3 Research Design	23
3.1 Research Objectives and Questions.....	23
3.1.1 Research Objectives.....	23
3.1.2 Research Questions.....	23
3.2 Case Study Approach	24
3.2.1 Synlait Milk Ltd Lead With Pride Case Study	24
3.3 Research Framework	26
3.4 Data Collection Methods	28
3.4.1 Interviews.....	28
3.4.2 Financial Implications.....	30

3.5 Ethics Approval	41
3.6 Data Analysis	41
3.7 Research Approach Summary	43
Chapter 4 Results	45
4.1 Factors Influencing Programme Adoption	45
4.1.1 Background Characteristics.....	46
4.1.2 Attitude towards LWP.....	47
4.2.3 LWP as Perceived Norm	74
4.2.4 Perceived Behavioural Control over LWP	77
4.1.5 Factors Affecting Programme Adoption Summary	80
4.2 Financial Implications of Adoption	80
4.2.1 Environment.....	81
4.2.2 Milk Quality	82
4.2.3 Animal Health and Welfare.....	83
4.2.4 Social Responsibility.....	85
4.2.5 Financial Evaluation Summary	85
Chapter 5 Discussion, Recommendations and Future Research.....	87
5.1 Discussion of Significant Findings and Recommendations	87
5.1.1 Factors Affecting Programme Adoption	87
5.1.2 Financial Evaluation	102
5.2 Limitations.....	109
5.3 Future Research	110
5.4 Research Summary	111
References.....	116
Appendix 1 Interview Schedule Certified Suppliers	129
Appendix 2 Interview Schedule Non-certified suppliers.....	133
Appendix 3 Overview of Complete Requirements	137
Appendix 4 Categorisation of Environmental Lead with Pride Requirements	138
Appendix 5 Categorisation of Milk Quality Lead with Pride Requirements	141
Appendix 6 Categorisation of Animal Health & Welfare Lead with Pride Requirements.....	143
Appendix 7 Categorisation of Social Responsibility Lead with Pride Requirements.....	146
Appendix 8 Lincoln University Human Ethics Committee Approval	148

List of Tables

Table 1 Heifer milk solid response	37
Table 2 Daily dry matter intake to achieve different rates of gain	38
Table 3 Summarised background characteristics of interviewed suppliers	46
Table 4 Lead With Pride Environment Pillar Financial Implications Summary	82
Table 5 Lead With Pride Environment Pillar Capital Expenditure Summary	82
Table 6 Lead With Pride Milk Quality Pillar Financial Analysis Summary	83
Table 7 Lead With Pride Milk Quality Pillar Capital Expenditure Summary.....	83
Table 8 Lead With Pride Animal Health and Welfare Pillar Financial Implications Summary	85
Table 9 Lead With Pride Social Responsibility Pillar Financial Implications Summary	85
Table 10 Lead With Pride Financial Evaluation Summary.....	86

List of Figures

Figure 1 The Innovation–Decision Process Framework	19
Figure 2 Theory of Planned Behaviour/Reasoned Action Approach	21
Figure 3 LWP adoption framework	27
Figure 4 Partial budget (schematic) of the annual economic effect of a cost-shared BMP	28
Figure 5 Synlait Supplier Catchment Area	32
Figure 6 Partial budget (schematic) of the annual economic effect of Lead With Pride Adoption	43
Figure 7 Populated LWP adoption framework	45
Figure 8 A LWP Gate Sign	74
Figure 9 Consideration of future implications	102

Chapter 1

Introduction

1.1 Research Background

1.1.1 New Zealand's Dairy Industry

New Zealand's wealth of natural resources particularly in regard to clean water, clean air, fertile soil and a temperate climate makes it well suited to agricultural production (New Zealand Government, 2015). Agriculture and its services (the wider primary sector) are of considerable importance to the New Zealand economy. Agriculture directly accounts for around 4% of GDP, while the processing of food, beverage and tobacco products accounts for a further 4% (New Zealand Government, 2015). In particular, the New Zealand agricultural sector has witnessed rapid growth in dairy production, with cow populations having grown from approximately 3.4 million across 1.3 million hectares in the 2000/2001 season to a fraction under 5 million over 1.75 million hectares in the 2016/17 season (DairyNZ, 2016). This growth has led to a significant increase in production amongst dairy processors, who by 2016 were processing 20.9 billion litres of milk, containing 1.862 billion kilograms of milk solids (DairyNZ, 2016). The introduction of refrigerated shipping in 1882 and, more recently, dry powders has meant New Zealand's dairy industry has become a viable exporter to international markets (Fraser, Ridler, & Anderson, 2014). In 2016 the export of dairy products accounted for around 29 percent of all export goods, contributing \$13.6 billion to the national economy (New Zealand Institute of Economic Research, 2017). These exports reach 160 markets globally, with over half being sent to Asian countries, although there has been notable growth of sales into Africa and Gulf Cooperation Countries. The New Zealand dairy industry is also a significant contributor to domestic employment with an estimated 40,000 workers being employed in the sector (27,500 on farms and a further 13,000 in dairy processing) (New Zealand Institute of Economic Research, 2017).

New Zealand's comparative advantage has been driven by its cost structure, characterised by the temperate climate with plentiful rainfall, which has permitted grass-based production without the need to house (and feed) animals during the winter (Fraser et al., 2014). Whilst

New Zealand's dairy production remains predominantly pasture-based, supplementary feeding strategies with concentrates are becoming increasingly popular and are contributing to increased production levels (Doupbrate et al., 2013). Consequently, despite the vagaries of commodity prices and commodity cycles, New Zealand dairy farmers have generally been able to maintain a sustained margin between international prices and cost of production (Fraser et al., 2014).

1.1.2 Agricultural Intensification

Whilst the growth of New Zealand's dairy sector has assisted economic growth, it has also required an increase in production and subsequent changes in practices to meet demand and maximise returns. Modern dairy operations seek to maximise the efficiency of their operations by converting resources to product where inputs such as water and energy (feed) are converted to animal protein in the form of dairy products (Doupbrate et al., 2013). This focus on production outputs alongside export growth to meet global demand has led to the intensification of dairying systems throughout New Zealand. Intensification can be defined as increasing the level of input of any kind to increase physical or economic productivity, which in the context of agriculture relates to an increase in outputs per unit area (MacLeod & Moller, 2006; Struik, Kuyper, Brussaard, & Leeuwis, 2014). However, the process of intensification has resulted in increased environmental effects and externalities which affect the wellbeing of third parties, such as the public (Foote & Joy, 2014). Consequently, there has been increased pressure on the agricultural sector to develop ways to improve its environmental performance and meet public demand for reductions in its negative impacts, particularly on water quality (Small, Brown, & Montes de Oca Munguia, 2016). In addition to production driven intensification, Barkema et al. (2015) notes that economic pressures, technological innovations, demographic shifts, consumer expectations, and an evolving regulatory framework are significant influencing factors for changes within the industry and are also factors driving its intensification.

Consumer expectation has also been a catalyst for dairy producers to develop solutions to address the concerns within markets worldwide, relating to the practices required to meet increased demand. These concerns relate primarily to the treatment of animals,

environmental impacts of production, food safety concerns, and social implications of various production methods (Olynk & Ortega, 2013). Many of these consumer demands are deemed to be credence attributes which can only be signalled to buyers through quality assurance schemes, due to their inability to be physically detected within the product (Northen, 2001). Wang, Mao, and Gale (2008) argue that consumers are willing to pay a modest premium for food that meets standards to ensure environmental and safe production related attributes.

1.1.3 Addressing Intensification

Addressing both the concerns of consumers and current on-farm practices from dairy intensification are key to the industry's long-term sustainability (Basset-Mens, Ledgard, & Boyes, 2009). Struik et al. (2014) argue that sustainable intensification is one means by which to achieve this. Sustainable intensification can be defined as "producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services" (Pretty et al., 2011 as cited in Petersen & Snapp, 2015, p. 2). Sustainable intensification is important as it ensures the balance between short and long-term objectives with respect to profitability, ecological health, and socio-ethical acceptability, allowing intensification, provided the system remains healthy and acceptable. However, facilitating sustainable intensification requires radical transformations in the social and economic organisation of agriculture (Struik et al., 2014). Several strategies have been conceived to reduce the effects of intensification that build upon the concept of sustainable intensification. These include placing an emphasis on the importance of brand integrity and access to premium markets, to reduce undesirable environmental consequences from intensification (Swaffield, 2014). Other means of addressing intensification include focused attention upon the framework of public policy and the implementation of management practices within the food supply chain (Swaffield, 2014). Finding solutions which are successful in their application, through managing the tensions between societal demand and practical applications that still facilitate economically profitable production is critical in addressing the issue of sustainable production (Moller et al., 2008).

To address agricultural intensification Struik et al. (2014) suggests there needs to be development beyond the current incentive systems and frameworks, to optimise specific values and include system interactions of dairy farms. This requires adapting farm management practices and assessment approaches that utilise farm synergies and account for trade-offs among the different facets of intensification (Chagunda et al., 2016). This is further recognised by Moller et al. (2008) who note that the development of management strategies that integrate the disciplines of an individual farming business are critical to addressing consumer demands and meeting the need to operate best practice systems.

1.1.4 Managing Intensification in New Zealand's Agricultural Industries

New Zealand agriculture is largely regulated by legislation (approximately 50 Acts of Parliament and 150 regulations) under the administering responsibility of the Ministry for Primary Industries (MPI) which covers a wide range of sectors including agriculture, forestry, biosecurity, fisheries, food and aquaculture (Ministry for Primary Industries, 2017). Much of this regulation exists to ensure minimum operating standards are uniform across New Zealand's primary industry producers. MPI's work covers primary production, exports, imports, food safety, biosecurity, fisheries, and animal welfare (Ministry for Primary Industries, 2017). Further to this, the agriculture industry is subject to other more general legislation, including the Resource Management Act 1991 (RMA) and the Health and Safety at Work Act 2015 (HSWA). Many of these acts have regionally specific rules, which derive from, for example, the RMA where the government charges regional councils with the responsibility of implementing the RMA objectives.

However, New Zealand has witnessed a decline in the role of the state in regional and national agricultural governance which has subsequently been gradually replaced by consumer and industry driven initiatives within certain market sectors (Haggerty, Campbell, & Morris, 2009). Industry driven responses such as farm assurance programs or initiatives are increasingly administered at the industry sector level either by the dominant industry bodies or individual supply companies (Manderson, Mackay, & Palmer, 2007). Auditable schemes have become increasingly popular as a support mechanism for sustainable intensification.

Industry bodies such as the New Zealand Wine Growers have implemented initiatives which promote best practice amongst producers. The Sustainable Winegrowing New Zealand initiative serves to highlight processes and metrics for maintaining a winery in an environmentally responsible way and operates across all growers (Flint & Golobic, 2009). This is typical of various industry or supplier initiatives, which target one element of the primary industry supply chain. New Zealand's dairy industry is largely characterised by high regulation and the interdisciplinary nature of on-farm elements including animal health, milk hygiene, occupational health and safety, environmental standards, and financial recording systems (Jay, 2007). This suggests that there is a need for a more holistic response to sustainable intensification within the industry.

Industry structure has a significant effect on the responses to sustainable development and in particular the availability of audited programmes with Campbell, Rosin, Hunt, and Fairweather (2012) noting that industries with dominant companies, such as ZESPRI in kiwifruit or Fonterra in dairy, typically have fewer audit programmes available in contrast to those such as sheep and beef where there are multiple smaller players. Many of the existing audit practices within New Zealand typically relate to food quality factors of production such as ensuring safe supplies of milk and meat that meet food safety standards and expectations with respect to hygiene and purity (Rosin, 2008). There is significant variation in the extent to which audit schemes are incorporated into New Zealand's farming sectors and a subsequent diversity amongst the responses of producers in each sector to auditable schemes (Rosin, 2008).

The on-farm practices of New Zealand farmers are emerging as an important focus. They have become subject to highly audited environmental standards of production demanded by elite consumer markets, society, and national governmental organisations (Haggerty et al., 2009). Many of these standards are being implemented by supplier companies as they recognise their responsibility to facilitate improved practices (Haggerty et al., 2009). Lawrence (2002) outlines that deregulation and elimination of government subsidies to agriculture in the 1980s has resulted in New Zealand typically encouraging individual firms to develop their own quality assurance systems to address respective market demands. As a result, quality assurance programs become unique to the processor. This has meant New

Zealand producers have become highly invested in their respective programmes leading to a greater commitment to the chosen processor. Furthermore, audit schemes help to promote collaboration amongst farmers who have a common interest in engaging in good practice farming (Rosin, Hunt, Fairweather, & Campbell, 2007).

Price signals indicating consumer willingness to pay premiums for higher quality products have demanded changes in the agricultural industry, including the development of new systems that pay producers engaging in quality audit systems (Clemens & Babcock, 2004). Haggerty et al. (2009) believes that farms must either follow the path of audited standards or remain in the unsustainable, intensifying trajectory of continuing to drive for maximum possible intensity of production to maintain profitable margins. Rosin (2008) outlines that audit schemes within the New Zealand dairy industry have typically revolved around processes that occur within the dairy shed with relation to milking procedures and milk quality. These audits are typical of New Zealand dairy companies who require their suppliers to have audited processes to ensure milk quality.

1.2 Problem Statement

A review of New Zealand's dairy sector has shown that New Zealand's growth in dairying in response to the global demand for dairy products has led to intensified agricultural causing a number of negative externalities (Foote & Joy, 2014). Achieving best practice throughout New Zealand's dairy industry is critical to its ongoing sustainability under intensifying conditions and the industry's competitive advantage in global markets (MacLeod & Moller, 2006). To achieve this, the New Zealand dairy industry needs to identify practical solutions to ensure that it can continue in a sustainable manner (MacLeod & Moller, 2006). An understanding of farmers' perceptions and the effectiveness of adoption is required to ensure the successful implementation of possible solutions. This understanding would allow options to be adopted amongst farmers and assist in addressing consumer and society demands. A review of New Zealand programmes aimed at managing the various issues associated with intensification highlighted a number and variety of programmes. However, understanding how these are perceived by those who participate in them may help in their success. Central to this, is a solution that addresses all components of an individual farm

business rather than focusing on individual elements as currently exists within many management strategies of New Zealand's primary industries. A systems based best management practice (BMP) response to intensification is required to achieve sustainable production. Researching possible tools to minimise the negative effects of intensification in New Zealand's dairy industry may help it to continue to prosper.

1.3 Research Motivation

Ensuring best practice within New Zealand's agricultural industry sectors is crucial to its sustainability and competitiveness within international markets. Finding ways in which the industry can improve best practice adoption amongst farmers is critical to the successful adoption of these practices. Insight gained from developing an understanding of effective ways to encourage best practice management and interpreting the potential financial benefits these can return to farms, could help with the adoption of best practice programs within the New Zealand dairy industry. This may help to address the issue of intensification and meet the demands of consumers globally.

1.4 Thesis Structure

Chapter 1 introduces the research looking at New Zealand's dairy industry and agricultural intensification and identifies the problem, before explaining the research motivations. Chapter 2 provides a review of the literature relevant to the research and exposes a gap within the literature, identifying the specific needs for this study. Chapter 3 outlines the research objectives and the questions which they seek to answer. Chapter 3 also details the design of the research and includes the relevant theories and conceptual frameworks that comprise the study and the methods used in data collection and data analysis. Chapter 4 presents the results of both the interviews to determine programme adoption drivers and the financial analysis. Chapter 5 presents the discussion of the results, the limitations and recommendations from findings. Chapter 5 includes a section identifying opportunities for future exploration before summarising the research.

Chapter 2

Literature Review

This chapter reviews the literature relevant to this research. The review focuses specifically on farm assurance schemes; the standards that typically comprise these and the process required for certification. It focuses particularly on whole farm system approaches to assurance schemes, motivations for adoption of such programmes and how BMPs fit within farm assurance programmes. The literature is examined to provide insight into the types and characteristics of farm assurance schemes that place emphasis on BMPs. The review then explores literature surrounding the motivations and perceived benefits associated with programme participation. From this review a gap within the literature is identified.

2.1 Farm Assurance Schemes

Farm assurance schemes are initiatives that provide primary production standards for food safety and other characteristics that are of relevant importance to consumers (Lewis, Tzilivakis, Green, Warner, & Coles, 2008). Farm assurance schemes encompass the principles of quality assurance and apply them at the farm level through quality assurance schemes, which operate throughout the food chain, at market, in transit and within the farm gate (Manning, Baines, & Chadd, 2006). The objective of farm assurance schemes varies according to their intended outcome, however they typically exist to assure the eventual consumer that the product they buy is safe to eat and has been produced in a high standard system (Lowman & McClelland, 1994 as cited in Leat, Marr, & Ritchie, 1998). In a broader sense farm assurance schemes can be defined as programmes which seek to ensure the quality, safety and integrity of food products at the first point of production (Spriggs, Hobbs, & Fearn, 1999), which in the context of this research, is the farm.

Holleran, Bredahl, and Zaibet (1999) suggest that the application of quality management principles means the adopter of a given scheme experiences operational efficiencies, through the documentation of processes, reduced poor performance incidences, staff familiarisation with processes and corrective action procedures. Schemes are characterised by a series of technical requirements relating to management practices of the given activity and use an

inspection system to verify compliance with requirements (Regmi, 2001). Farm assurance schemes help to improve farming practices through implementation of BMPs whilst simultaneously addressing consumer demands (Lewis et al., 2008). Whilst there is some aspect of self-responsibility in implementing farm assurance schemes, much of their increase in popularity is driven by the markets (Blackman & Rivera, 2010). BMPs are a response to consumers' concerns for the wellbeing of those producing products and the environment in which they are produced (Rueda & Lambin, 2013a).

2.1.1 Whole Farm Approach to Quality Assurance

Schils et al. (2007) recognises the complexity of dairy systems, noting that they comprise several interacting subsystems such as livestock, effluent management, soils, and crops. Typically, assurance schemes focus on single components of the farming system (Fearne, 1998; Main, Webster, & Green, 2001; Nilsson, Tunçer, & Thidell, 2004; Veissier, Butterworth, Bock, & Roe, 2008). In contrast, a whole farm system approach considers the farm holistically as an integrated operation with its business functions comprising numerous components (Lewis et al., 2008). Viewing the farm as a whole system means it is considered as an entity, which includes both the social and the technical aspects of a farm and, more importantly, the connections among the social, biological, and technical elements involved (Noe & Alrøe, 2003). Consequently, a whole farm assurance scheme can be considered a programme that encompasses the principles of quality assurance and applies them across all components of the farming enterprise. A whole farm approach is critical to ensuring the interdisciplinary nature of individual farming components are considered within any given assurance scheme (Schils et al., 2007). Lewis et al. (2008, p. 1089) argue that it is "vital to consider the farm as a whole, rather than any isolated part, if a more sustainable system is to be attained". More integrated approaches that encompass the various components comprising a farming system are critical to achieving a solution across the entire farming business. A whole-farm integrated approach is a way in which policy makers and regulators are introducing mechanisms to deliver improvements to farming practices and their associated effects, including both environmental, political and consumer perceptions (Lewis et al., 2008).

Lewis et al. (2008) notes that initially, sector specific schemes, were set up with producer involvement. In parallel, various retailers developed their own systems. This resulted in a plethora of approaches and structures due to each scheme being developed independently, with each also being managed and audited separately. There is extreme variation within the certification systems that exist, with each taking an individual approach to achieve the objectives of the organisations adopting them (Bailey & Garforth, 2014). Despite this variation in scheme development and outcomes, all schemes are largely consumer interest driven and target specific niche demands. This means schemes vary in their focus and may embrace legislative requirements for food safety and quality, or adopt production related standards such as animal welfare and the environment (Manning et al., 2006). Noordhuizen and Metz (2005) note that quality control implementation through farm assurance schemes must be associated with the entire production process and not just the final consumer product. This requires whole farm integration that looks beyond the intrinsic quality properties of the primary industry product (e.g. meat, milk, wool) and considers the extrinsic production factors such as ethical considerations and personnel health (Manning et al., 2006). Regardless of the focus of a given scheme, for it to be of significant value to the consumer or industry it must be recognised as being run competently, reliably and in a manner which reflects consumers' interests (Leat et al., 1998).

2.1.2 Farm Assurance Scheme Adoption Drivers

There are a number of factors identified throughout the literature that have an impact upon the adoption of best practice farm management, such as financial factors (debt to equity ratio, alternative income sources, cash flow), farm characteristics (farm size, intensity, land use capability), demographic factors, psychological factors and characteristics of innovation (DaviDe Menozzi, 2015; Hansson, Ferguson, & Olofsson, 2012; Serra, Goodwin, & Featherstone, 2004; Small et al., 2016). Blackman and Rivera (2010) detail that initiatives certifying that farms are adhering to predefined environmental and social welfare production standards, are increasingly popular and create financial incentives for farmers and companies to improve their environmental and socioeconomic performance. An emphasis has been placed on offering a small premium to farmers who are willing to comply with a set of criteria (Blackman & Rivera, 2010). When determining the financial reward associated with

participation in a farm assurance scheme, those who are providing certification schemes must ensure that the price incentives are high enough to offset the costs of certification and attract a significant number of applicants (Blackman & Rivera, 2010). A number of studies identify that incentive premiums associated with farm assurance schemes play a key role in the extent and rate of their adoption (Daberkow & McBride, 2003; Hobbs, 2002; Valentin, Bernardo, & Kastens, 2004). The improved information from sustainable certification initiatives facilitates the ability to offer price premiums for certified products, and these premiums can be pushed downstream, creating financial incentives for farms meeting certification standards (Blackman & Rivera, 2010). These premiums are a key condition and the initial motivation for entering certification systems, as they give reason to invest time and money into learning about the protocol, changing practices, and upgrades to farm infrastructure (Blackman & Rivera, 2010; Valentin et al., 2004). Monetary premiums have had a significant impact on the financial benefits obtained through participating in farm assurance schemes and are a significant motive for obtaining certification in industries experiencing financial difficulties (Greer, 2013).

Programme requirements are composed of individual standards, however there is great variability and little consistency among different existing programmes. There have been several attempts to develop some general standards for the certification of agricultural BMPs that could be consistently applied throughout the world. However, these attempts have been compromised as the standards require compliance with national regulations which vary considerably themselves (Lewis et al., 2008). This indicates that while a generic set of standards for certification of best practice within an agricultural setting would be an optimal solution, the variations that exist in a nation's individual regulations mean there is a requirement for individualised programmes. A lack of government intervention within farm assurance programmes has meant that producers and retailers have constructed their own programmes which have further added to the number of standards being implemented (Hobbs, Fearne, & Spriggs, 2002). This variation in programme characteristics exists even though many programs seek to achieve common goals. As such any research must be focussed on individual programmes, as there are many variations of programmes worldwide that apply specifically to the context of the respective location.

Rueda and Lambin (2013a) acknowledge that certification can provide other socioeconomic benefits, not necessarily intended in the design of certification schemes. These benefits that go beyond those of the premiums paid to producers are not well understood. Whilst the financial incentives in certification are a key benefit, it is difficult to understand the socioeconomic benefits that are achieved through certification, which are equally important when considering the farm as a whole (Lewis et al., 2008). Price premiums constitute only an element of the success of certification programmes and as such, research will need to consider the other additional benefits. A survey of supply chain stakeholders in the United Kingdom revealed that one of the major problems with the development of farm assurance schemes is a lack of understanding of their purpose and benefits amongst farmers (Duffy & Fearn, 2009). There are varying expectations of the benefits derived from participation in farm assurance programmes amongst farmers and it is important that these are understood and met (Duffy & Fearn, 2009). Rueda and Lambin (2013b) found that once farmers were in a certification programme they valued other gains far more than price differentials. These other gains include better staff engagement, improved operating systems and on-farm efficiencies, which are not often considered in the context of programme adoption. However, it is these additional benefits that may often hold more value to the farmer. This is an important consideration given that non-premium related benefits explain retention in a certification program, which is key to ensuring their sustainability (Rueda & Lambin, 2013b).

However, there is a lack of empirical evidence of increases in profitability, directly attributed to changes in business operations, as a result of meeting certification requirements.

Implementation of farm assurance schemes is commonly communicated as not impacting upon production but this does not necessarily translate to their adoption having no impact on profitability (Valentin et al., 2004). Understanding the impacts of adoption on farm profitability is important when considering the requirements of food producers (Daberkow & McBride, 2003). Furthermore Duffy and Fearn (2009) recognise that to justify a price premium in achieving farm assurance there is a need for a unique selling proposition of the given product. However, the opinions of British meat processors and retailers are that farm assurance does not constitute such a unique selling proposition. This is because processors and retailers firmly believe that “farm assurance merely underpins the quality standards that are a necessary part of supply” (Duffy & Fearn, 2009, p. 676).

2.1.3 Types of Farm Assurance Schemes

Farm assurance schemes vary and can be either mandatory or voluntary (Henson & Humphrey, 2010). Standards may also be operated by a private organisation or within the public realm and may be required or optional for agri-food producers. Schemes may comprise a mixture of types and consequently four amalgamations of scheme types arise; public (typically government operated) and voluntary or compulsory (legislative), or privately operated and voluntary or compulsory (required for customers) (Henson & Humphrey, 2010).

Global agricultural markets are increasingly recognising accredited standards including international codes of conduct and quality assurance (such as International Standards Organisation (ISO) and Fair Trade) as highly important aspects of assurance schemes. These internationally recognised accreditation systems provide benchmarks for an individual scheme, establishing expectations for certification systems and their processes (Karapetrovic & Willborn, 2000). ISO is an independent, non-governmental international organisation that through its members, brings together experts to share knowledge and develop voluntary, consensus-based, market relevant international standards that support innovation and provide solutions to global challenges (International Organization for Standardisation, 2017). ISO standards have typically been adopted in a production and manufacturing context where quality certification standards have emerged as a key organisational practice, helping companies worldwide establish rationalised production processes (Guler, Guillen, & Macpherson, 2002). Most agricultural ISO schemes (e.g. Silver Fern Farms Farm Assurance Programme, ANZCO Farm Assurance Programme, The Northern Ireland Beef & Lamb Farm Quality Assurance Scheme, The Kiwa PAI International Pig Scheme, Synlait Milk Lead With Pride, Miraka Te Ara Miraka, Ovation Quality Assurance Programme) are accredited to ISO 17065 (conformity assessment- requirements for bodies certifying products, processes and services), which provides assurance that certification bodies operate certification schemes in a competent, consistent and impartial manner (International Organization for Standardisation, 2017).

Main et al. (2014) acknowledge that ISO 17065 certification gives confidence that a scheme is verifying that the participating farms comply with the scheme's standards on a regular

(typically annually) basis. The requirement for independence between the standards setting body and the body responsible for the certification decision means that issues can arise relating to the defined primary ownership of the scheme and consequential responsibility for its future development (Main et al., 2014). Ensuring and facilitating continuous improvement within a scheme and the application of this at the farm level is essential for the scheme's development as it drives programme improvement. This requires regular monitoring of the predefined criteria and a preventive and corrective action management system to ensure this is delivered (Main et al., 2014). Furthermore, quality assurance schemes belonging to internationally recognised performance standards can assist in the facilitation of commerce between countries through the reduction of transaction costs and mutual understanding of the programme's credibility (Regmi, 2001).

The most commonly adopted forms of ISO standards discussed in the literature are ISO 9000 and ISO14000, both of which are directed at the management systems within organisations and are similar in that both can be applied to any kind of organisation (Wall, Weersink, & Swanton, 2001). These common ISO standards certify the producer's management processes and are credited to the organisation, whereas ISO 17065 certifies the certification process, associating the producer with an accredited programme. Nevertheless all three share commonalities of imposing standardised and replicable routines and procedures that encourage practices that improve organisational performance (Naveh & Marcus, 2005). Whilst certification schemes can increase business efficiencies and processes, Love and Li (2000) outline the extra work that is often imposed on staff and the negative effects this can have on staff motivation, as they often view certification as a necessary non-productive evil.

2.1.4 Best Management Practice

Best practice in the context of dairy farming ensures that the milk and milk products are produced in a safe and suitable manner for intended use, whilst ensuring that the dairy farm enterprise is viable into the future, from economic, social and environmental perspectives (FAO & IDF, 2011). BMPs provide the foundations for the production of safe, quality-assured dairy products in a sustainable manner that underpins the future of dairy farming at a local, national and international scale (FAO & IDF, 2011). BMPs have been developed in

recognition of the complex challenges of conservation, land management and water resources for sustainable intensification of agriculture, permitted through the allocation of substantial resources by governments, donors and development partners (Shiferaw, Okello, & Reddy, 2009). Education extension relating to BMPs is critical to their success, as without this a farmer may be inefficient in the use of the best practices and consequently associated implementation and application costs may be greater (Tauer, 2001).

BMPs are commonly the basis for farm assurance schemes, being incorporated within the standards for which certification is audited against (Wood, Holder, & Main, 1998). This requires objective evidence of BMPs as part of a farm assurance scheme's certification process for auditing against set requirements (Karapetrovic & Willborn, 2000). The need for BMPs has been driven by consumer demand for higher standards of food production and the consequential pressures for government and agricultural industries to provide measures to meet best practice expectations (Dagg, Butler, Murray, & Biddle, 2006). Their development has also stemmed from a need to show proactive responses to sustainable development within the agricultural industries and demonstrate implementation of governmental policy (Rigby, Woodhouse, Young, & Burton, 2001). BMPs ultimately relate to the need for farmers to ensure the long-term sustainability and viability of their operations (Miller, 2014). BMP has typically been a term utilised within environmental management literature, relating specifically to environmental concerns with agricultural production regarding the methods, measures or practices designed to prevent or reduce pollution (Boyd, 2003; Logan, 1990). Consequently the term BMP has often been referred to as Good Management Practices (GMP) or Good Agricultural Practices (GAP) (Boyd, 2003). BMPs in a farm management context can be defined as the application of "available knowledge to addressing environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products" (FAO, 2003, p. 1).

2.2 Farm Assurance Scheme Motivations and Perceived Benefits

It is important to understand the motivations and perceived benefits of producers undertaking quality assurance schemes to understand farmer adoption of BMPs and to develop directions for future research (Prokopy, Floress, Klotthor-Weinkauf, & Baumgart-Getz 2008). Understanding drivers and barriers to adoption of agri-food assurance systems allows for the design of better, more appropriate-for-the-task assurance systems, that are more likely to be fully utilised by value chain members and more effectively protect the agri-food reputation in markets (Soderlund, Williams, & Mulligan, 2008). Understanding the motivations and risks of farmers is required within the design of BMPs to tailor and bundle incentives for maximum effectiveness and efficiency (Greiner, Patterson, & Miller, 2009).

A study by Payne, Bruhn, Reed, Searce, and O'Donnell (1999) surveying dairy farmers and industry leaders for an assessment of interest in implementing a dairy quality assurance programme in California, revealed that in order for a programme to be successful it should be voluntary, managed by the milk processor, and confer an economic advantage on participants. Producers' reluctance to adopt best practices generally relates to the uncertainty of the impact on farm profitability and whilst they may be yield neutral (have no impact on production volumes) there can be other related costs (Valentin et al., 2004). The acceptability of a given audit scheme is influenced by farmers themselves, in relation to a number of characteristics including whether the source of the scheme is local or external, a scheme's balance of paperwork and physical management practice and importantly some tangible rewards for compliance (Rosin et al., 2007). The initiation and development of a programme can be significantly enhanced through collaboration with supply companies/processors such as a dairy producer (Payne et al., 1999). Farmers who perceive a practice will be profitable are more likely to adopt than others, suggesting that there is a requirement for more research on the long-term financial impacts of BMP adoption to help increase adoption rates (Prokopy et al., 2008).

While much of the literature highlights the requirement for a financial reward, Greiner et al. (2009) argue that recognition by peers and the community can be an equally powerful

incentive particularly for socially motivated farmers. Ingram, Gaskell, Mills, and Short (2013) note that several studies regarding adoption influences of auditable schemes, have concluded that extrinsic and intrinsic motivations are both influential, including seeking financial rewards and predominately, a desire to satisfy personal goals and self-fulfilment. Typically, voluntary participation in programmes, promoted through education extension programmes has been encouraged by state-level policies, due to the fact they are based upon the assumption that BMPs are profit-neutral (Valentin et al., 2004).

A participation observation study of five dairy farm families outlined that farmers' expression of self-pride in their production practices and a desire to achieve high levels of production were factors influencing their adoption and subsequent perception of BMP programmes (Jay, 2007). The research also found that production is viewed as an ethical good, and that it inspires a degree of emotional commitment that is beyond the calculus of profit and economic reasoning (Jay, 2007). Farman-Bowers and Lane (2009) outline farm succession as being a central and overriding motivation for farmers. Furthermore, extension, education and research play a critical supporting role in the adoption process, particularly where there will be comprehensive changes to the current operating system (de Buck, van Rijn, Roling, & Wossink, 2001). The non-adoption of BMP audited programmes by farmers is driven by their challenging of audited systems because audits compromise the independence and craftsmanship that they value (Rosin, 2008). Many programmes require a significant change in the practice of farming particularly with regards to audit schemes, that by their very nature, require increased documentation of practice in the form of paperwork (Rosin et al., 2007).

Small et al. (2016) speculate that farmer adoption is a complex and non-linear phenomenon and that under different conditions the influence of particular variables on the adoption of good practice may increase or decrease. Specific attitudes towards, and awareness of BMPs should be examined to develop a comprehensive insight into motives, rather than that of a general awareness in relation to specific farming business elements (Baumgart-Getz, Prokopy, & Floress, 2012; Small et al., 2016; Sutherland, 2010). Understanding how and why farmers with otherwise similar conditions behave differently is essential in driving adoption amongst a diverse group of people with common interests (Hansson et al., 2012). Contrary

to the above literature, Reimer et al. (2012) focus more simplistically on the links between perceptions of BMPs and their adoption, noting that where practices are viewed more favourably, they are more likely to be adopted. They argue that the influence of individual farmer characteristics (such as age and education) upon adoption decisions is less significant. The authors believe that the promotion of BMP programmes should be based upon their unique features (Reimer et al., 2012).

Many studies focus on the adoption and perceived benefits of BMPs, relating to a singular component of farming practices (for example environmental BMP) (Baumgart-Getz et al., 2012; Reimer et al., 2012; Valentin et al., 2004). Assessment of whole farm approaches to BMPs, adoption, effectiveness and perception is seldom explored in the literature.

2.3 Adoption Theories and Frameworks

The following subsections discuss the theories and frameworks that exist within existing literature exploring adoption of best management practices in an agricultural context. It gives context to the theories that underlie some of the frameworks explored, to understand adoption behaviours and how this can influence final decisions.

2.3.1 Diffusion of Innovation

In modern agricultural operating environments, farmers require innovations that can be implemented at the farm level to increase efficiency and provide a competitive edge for the business (Läpple, Renwick, & Thorne, 2015). Rogers (2003, p. 12) defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other.” To assist in facilitating innovation within the food production sector there needs to be an improved understanding of the innovation behaviours of farmers (Läpple et al., 2015). To get a new idea adopted, even when it has obvious advantages, is often very difficult, hence the demand for increased understanding surrounding this (Rogers, 2003).

Material removed due to copyright compliance

Figure 1 The Innovation–Decision Process Framework (Morris, Mills & Crawford, 2000)

The diffusion of innovation theory refers to “the spread of abstract ideas and concepts, technical information, and actual practices within a social system, where the spread denotes flow or movement from a source to an adopter, typically via communication and influence” (Rogers, 1995 as cited in Wejnert, 2002, p. 297). The diffusion framework (Figure 1) includes the provision of prior conditions which shape the disposition of potential adopters towards the innovation (Morris, Mills, & Crawford, 2000). The diffusion of innovation theory is well-established within agricultural studies, explaining the adoption and diffusion of production-oriented agricultural technologies and initiatives, described as a useful, versatile and accessible framework for understanding adopter behaviour (Morris et al., 2000). Rogers (2003) outlines five attributes of an innovation that ultimately affect adoption. These are, relative advantage, compatibility, complexity, trialability, and observability. Whilst these attributes of innovation were originally developed on the influences on adoption by farmers, similar attributes have been utilised in the research of other sectors, for example, teachers and school administrators (Rogers, 2003). Relative advantage is the perceived enhancement that may be obtained through adopting the innovation and with adoption rates increasing, the stronger this factor is. Complexity relates to how comprehensible and simple a given innovation may be. Compatibility explores how well a given innovation may operate within current systems and those who operate it. Trialability is the opportunity for an adopter to assess and experience an innovation prior to adoption. Observability refers to the how easily an innovation may be seen in practice. Understanding these attributes of a potential adopter helps explain the given individual’s behaviour and ultimately the possibility of adoption (Rogers, 2003). Moreover, manipulating each of these factors can result in an increase in

innovation adoption (except, of course complexity, which is negatively correlated with adoption) (Lundblad, 2003). The diffusion of innovation theory has been criticised for being prescriptive, static and deterministic, and evokes a linear process for the progression from awareness through to adoption despite the unpredictable, uncertain and diverse nature of this process (Morris et al., 2000).

2.3.2 Theory of Planned Behaviour/ Reasoned Action Approach

The Theory of Planned Behaviour (TPB) examines the relationship between an individual's attitudes and their actions, hence providing a theoretical basis for understanding motives in adoption. Hansson et al. (2012) outlines that the TPB explains human behaviour as the outcome of three central psychological constructs:

1. Attitudes toward the behaviour;
2. Subjective and descriptive norms; and
3. Perceived behavioural control

The TPB therefore assumes that a behaviour originates from an individual's intentions to perform a specific behaviour (Hansson et al., 2012). Whilst attitude is a central construct in the theory, it is also important that a potential adopter believes that others in their social network support the behaviour. Moreover, an individual also needs to feel that they can influence and control the behaviour (Hansson et al., 2012). Fishbein and Ajzen (2011, p. 20) extended the TPB to encompass the Reasoned Action Approach (RAA) (Figure 2) which holds that "human social behaviour follows reasonably and often spontaneously from the information or beliefs people possess about the behaviour under consideration."

The RAA is developed on the basis that an individual's intention to perform a given behaviour is guided by their beliefs. It states that varying beliefs present within an individual lead to their behavioural intention or readiness to perform the behaviour (Fishbein & Ajzen, 2011). The more favourable the attitude and perceived norm the stronger an individual's intention to perform the behaviour should be (Fishbein & Ajzen, 2011). Despite this, a behaviour is not always under volitional control (intention can be expressed as behaviour) and the performance of the behaviour will often require cooperation with other factors such as skills, specialist knowledge, money and time (Burton, 2004). Figure 2 incorporates the diffusion of

innovation theory showing the influence of perceived practice characteristics, comprising the attributes of innovation, upon one's varying beliefs. Figure 2 shows Reimer et al. (2012) application of the RAA within an agricultural context, relating specifically to the adoption of BMPs.

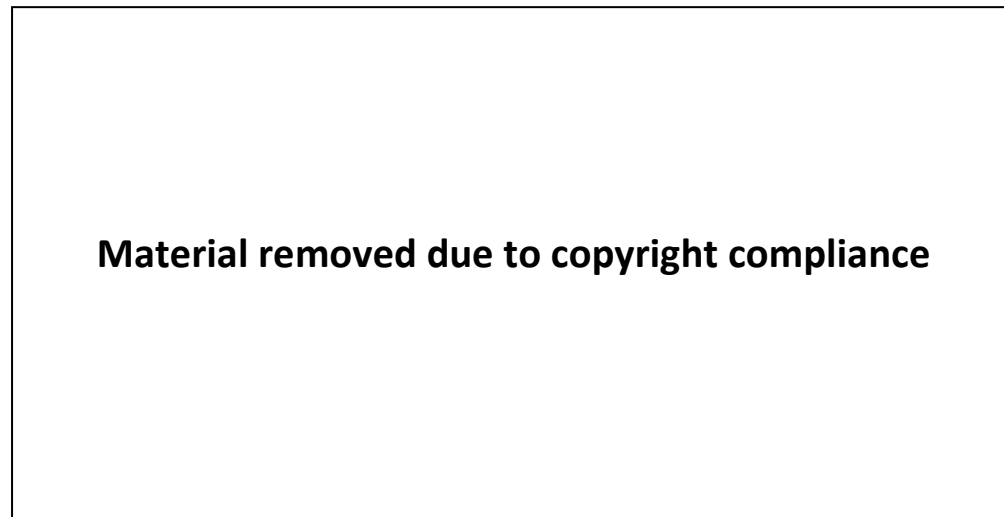


Figure 2 Examining the role of practice characteristics in influencing the decision to adopt through the lens of the Theory of Planned Behaviour/Reasoned Action Approach (Reimer et al., 2012, p. 119)

Reimer et al. (2012) outline that the indirect effects of background factors such as personal characteristics, farm characteristics and farm context, influence perceived practice characteristics, which in turn influence behavioural, normative, and control beliefs (Figure 2). Notably the three prominent drivers of intentions to adopt and ultimately a behavioural change can vary greatly dependent on the dynamics of the particular behaviour being adopted (Reimer et al., 2012). Influencing behavioural intentions through attitudes, perceived norms and perceived behavioural control, is critical in encouraging a given behaviour or adoption. This is because the stronger an intention to engage in a behaviour the more likely it is to be performed (Ajzen, 1991). Attitude relates to an individual's response in a favourable or unfavourable manner towards a given physiological object or concept (Fishbein & Ajzen, 2011). Perceived norm provides understanding of the extent to which an individual's perceptions relate to the apparent prevalence of a behaviour, and the pressures they experience to conform (Rimal & Real, 2003). Perceived behavioural control provides an understanding of an individual's perception surrounding the degree to which they have the ability to perform or physically have control over performing a given behaviour

(Fishbein and Ajzen, 2010 as cited in Yzer, 2012). Understanding behavioural intentions can be used to determine the success in achieving that given behaviour (Ajzen, 1991).

RAA has been criticised for being utilised to achieve a vast array of intentions and often behaviours being unaccounted for, with the models being too rational and not considering some of the cognitive and affective processes that are known to influence human behaviour (Ajzen, 2011). Despite this, the theory of planned behaviour has become one of the most utilised, cited and influential models when predicating human social behaviour (Ajzen, 2011).

2.4 Literature Gap

Most of the literature on adoption of farm assurance programmes focuses on individual farming practices or areas of the farming business such as animal health or environmental sustainability, rather than a whole systems approach. This is largely a reflection that most approaches to farm assurance schemes themselves focus on individual elements of the farming operation. Consequentially there is little literature that explores the adoption drivers and perceptions of farmers undertaking whole farm assurance programmes. Furthermore, there appears to be no literature that quantifies the benefits and return to the farm through adopting a whole farm assurance scheme, which the literature suggests may have a significant impact upon adoption given the importance placed upon economic factors.

Chapter 3

Research Design

3.1 Research Objectives and Questions

3.1.1 Research Objectives

Given the literature gap presented in chapter 2 this research seeks to better understand the value derived from adopting and participating in whole farm assurance programmes, from the perspective of farmers. The specific objectives related to this study are to:

1. Improve understanding of the motives driving the adoption or unwillingness to adopt whole farm assurance programmes, to allow better communication of these to potential adopters.
2. Gain an understanding of the direct and indirect impacts on the farm business of achieving a whole farm assurance programme certification.
3. Improve understanding of the financial costs and benefits associated with adopting a whole farm assurance programme

3.1.2 Research Questions

There are various factors that must be considered when attempting to understand the value derived from participation in farm assurance programs. The study intends to meet the above objectives through answering the corresponding research questions:

1. What are the motivations driving supplier willingness to adopt whole farm assurance programmes?
2. What are the associated effects in achieving certification of a whole farm assurance programme?
3. What is the financial impact of adopting a whole farm assurance programme?

3.2 Case Study Approach

Research exploring best practice effectiveness has typically identified a case study approach (looking at individual programme adoption) as an effective means of structuring qualitative research. It is considered an appropriate model when conducting exploratory research in an agricultural context, where individual farm informants are an effective means of obtaining data (Holleran et al., 1999). A case study approach is appropriate when “a phenomenon of some sort is occurring within a bounded context and as a result the case in effect becomes your unit of analysis” (Baxter & Jack, 2008, p. 545). Case studies have often been viewed as a useful tool in the preliminary, exploratory stage of a research project (Rowley, 2002). Neale, Thapa, and Boyce (2006) recognised that case studies are appropriate when there is a unique or interesting story to be told. Yin (2003) outlines that a case study is useful in the instance of contemporary events, when the behaviours of those relevant to the study cannot be manipulated. The uniqueness of whole farm approaches to quality assurance and the exploratory nature of this research means it aligns well with a case study approach.

3.2.1 Synlait Milk Ltd Lead With Pride Case Study

Synlait Milk Ltd (Synlait) is a New Zealand manufacturer of nutraceutical and nutritional value added dairy products with the vision to become the world’s most innovative and trusted dairy company (Synlait Milk Ltd, 2017b). With this focus, Synlait’s main products include customised milk powders, infant formula, adult nutritional powders and nutraceutical products (Synlait Milk Ltd, 2017b). In 2013 Synlait introduced a voluntary, whole farm system, BMP certification scheme, Lead With Pride (LWP), to its suppliers (Greer, 2013). According to Synlait their LWP programme exists to demonstrate industry leadership in food safety and sustainability, demand excellence and ensure improved farm performance and higher financial returns for milk through the implementation of best practice measures within the farm assurance scheme (Synlait Milk Ltd, 2013). LWP recognises and financially rewards suppliers who achieve dairy farming best practice. This is achieved through a focus on the key aspects of farm operations through a four-pillar approach to the programme. These include the environment, animal health and welfare, milk quality and social responsibility (Synlait Milk Ltd, 2017a). As a result, LWP can be considered a whole farm assurance scheme, given the interdisciplinary nature of the four pillars.

In this research the case study is Synlait's LWP programme. An evaluation of its financial value and an understanding of motivation drivers and other direct and indirect advantages or disadvantages of farmer suppliers in achieving certification are required. The study boundaries remain within that of the company. Their programme, in contrast to the literature and research into other certification programmes, is unique in its approach. Synlait has focused on developing a programme which provides a new approach to setting expectations of its suppliers in achieving sustainable dairy farming across the spectrum of farming practices (Wren, 2018). LWP was initiated by Synlait because they deemed it to be "simply the right thing to be doing" (Wren, 2018, p. 38).

The programme is the only whole farm dairy assurance system within Australasia with International Standards Organization 65 (ISO/IEC 17065) accreditation (Synlait Milk Ltd, 2017a). Suppliers are independently audited by AsureQuality¹ who ensure that the programme's standards are being met and award certification if successful. An audit is completed annually to ensure compliance with the programme is being maintained. The programme includes three levels; Gold, Gold Plus and Gold Elite. Gold is the standard currently being met by all Synlait Milk suppliers and does not include an ISO 65 certification (Synlait Milk Ltd, 2013). Gold Plus is the first level of the ISO 65 certification and requires suppliers to meet the requirements covering the four pillars, by maintaining the high level of documentation and standards required. Suppliers are paid a premium of 6 cents per kilogram of milk solids for achieving accreditation to this level (Cronshaw, 2013). The highest level of accreditation – Gold Elite requires suppliers to have maintained Gold Plus certification for a minimum of 12 months and meet the additional standard requirements under the four pillars. For achieving this, suppliers are paid a premium of 12 cents per kilogram of milk solids (Cronshaw, 2013). As of June 2017, Synlait has 46 Gold Plus certified suppliers and 4 Gold Elite. Cronshaw (2013) recognises the uniqueness of the programme stating that a number of overseas companies have adopted accreditation schemes, but not to the same level as Synlait's programme.

¹ AsureQuality provides food safety and biosecurity services to the food and primary production sectors, acting as an independent auditor for a number of farm assurance audits for meat, wool and dairy companies.

The initial intent of Synlait was to design and implement an environmental sustainability certification scheme in response to increasing concerns around the environmental impacts of dairy farming in New Zealand. Throughout the development stages the company recognised the need to include other aspects of best practice and sustainability across a dairying business and as such expanded the development to include these considerations across the whole farming system. LWP was developed, not necessarily in direct response to market pressures, but merely because it helps to meet community concerns around dairying and land use change (Greer, 2013). An initial study by Greer (2013) estimated that the benefits returned to the farm were around \$120,000 per annum (excluding the initial capital costs of between \$5,000 to \$10,000). The greater part of these benefits comprised improvements in animal health and welfare and in social responsibility (Greer, 2013). She concluded the biggest benefits of certification were the ongoing business improvements suppliers would implement across their farms (Cronshaw, 2013).

3.3 Research Framework

Based on the literature and the RAA/TPB frameworks, a conceptual model was developed for this study to examine those factors influencing adoption of LWP and to provide insight into the advantages and disadvantages of the programme (Figure 3). The solid lines show the directional influence of various characteristics as they feed towards the final behaviour. The background characteristics included factors that were specific to individual farmers, many of which cannot be controlled, such as age. These factors help influence an individual farmer's beliefs about participating in LWP. They include how they perceive the programme in terms of whether it will provide them with an advantage for their farm system or whether they believe participation to pose a potential risk. The various perceived practice characteristics contribute towards informing the farmer's belief and subsequently their attitude towards the programme. This includes whether they perceive the program to be the normative approach and the extent to which they have control over applicability of the programme. An individual's attitude towards LWP is considered to be their belief, opinion, evaluation or preference towards favouring or disfavouring it (Sulemana & James, 2014). For this study, the perceived norms encompassed LWP being considered for its widespread adoption amongst other farmers and the societal pressures for programme adoption. Perceived

behavioural control related to the degree to which programme participants perceived they had the ability to control their participation in the programme and extended to their perception of control over programme requirements.

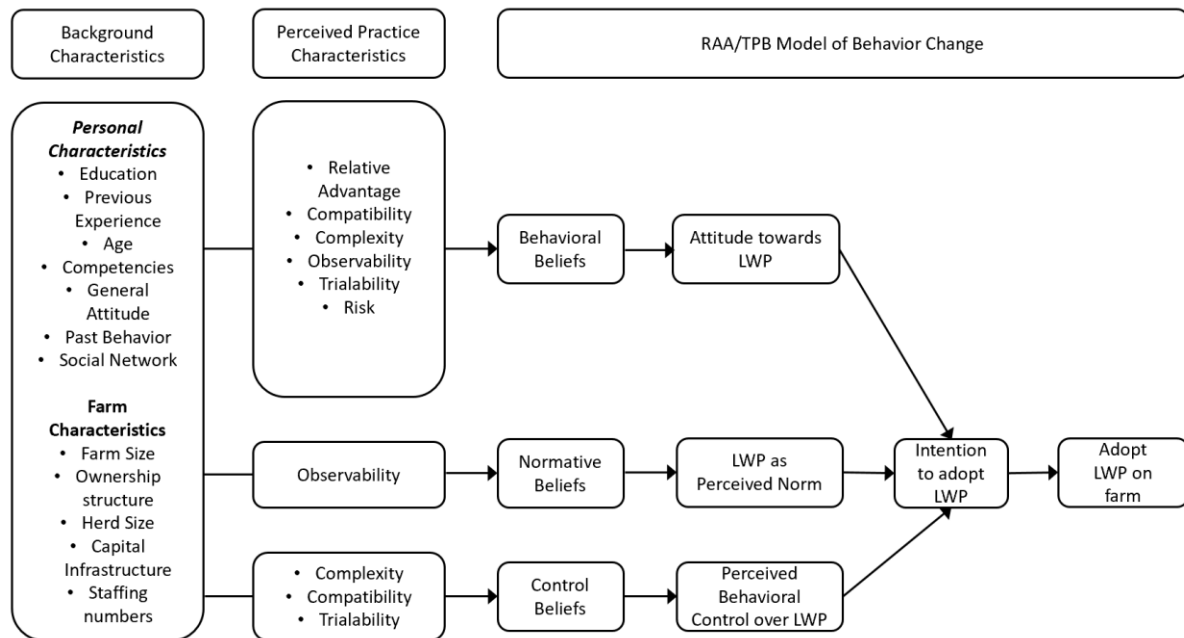


Figure 3 LWP adoption framework adapted from Reimer et al., 2012, p. 119

Renzi and Klobas (2008) outline the basis for examination of qualitative research utilising the TPB as opposed to its typical utilisation within quantitative research. Utilising the TPB within qualitative research is a complex process requiring more effort to demonstrate the quality of the results obtained (Renzi & Klobas, 2008). Difficulties arise with selecting appropriate sample sizes within qualitative research which can be overcome by maintaining credibility through the richness of information gathered, triangulation of data, and thorough analysis and presentation (Patton, 1990; Renzi & Klobas, 2008).

A review of the literature identified frameworks for assessing the financial implications of adoption of whole farm assurance programmes. Cost Benefit Analysis (CBA) allows for the systematic categorisation of impacts as benefits (pros) and costs (cons), by assigning values to determine the net benefits of a given project or decision (Boardman, 1996). Wossink and Osmond (2002) study the cost effectiveness of BMPs utilising the net present value method to assess the net profitability of BMP programmes (Figure 4). This enabled longer-term

income flows to be included when considering the option to adopt BMP. Utilising this method requires that the BMP programme be considered as a standalone activity and the assessment based upon the principle that an intervention with such a programme and the consequential change will cause both benefits and costs (Wossink & Osmond, 2002).

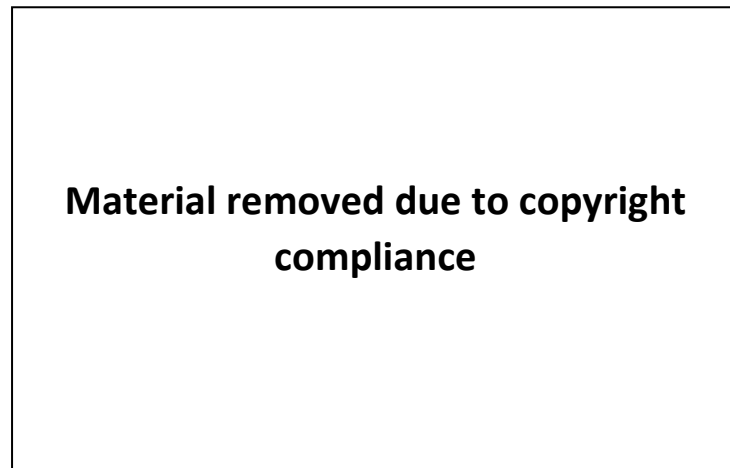


Figure 4 Partial budget (schematic) of the annual economic effect of a cost-shared BMP (Wossink & Osmond, 2002, p. 214)

3.4 Data Collection Methods

3.4.1 Interviews

The data required to inform the LWP adoption framework was collected through interviews with case study farmers. The population from which these research informants was drawn, was limited to that of Synlait suppliers who were, or could, become LWP certified. All interviews were semi-structured, open-ended interviews in which participants were asked identical questions (actual discussion varied given the open-ended approach). Semi-structured interviews are characterised by their flexible nature and ensure sufficient structure to address the specific requirements of the research question, while also facilitating study participants to offer new meaning to the topic of study (Galletta, 2013). Utilising an open ended approach to the interview questions meant informants were able to contribute as much detailed information as they desired (Turner, 2010).

3.4.1.1 Informant Selection

Eisenhardt (1989) notes that selecting informants randomly is neither necessary nor preferred, rather choosing cases for theoretical reasoning over statistical methods means cases can be chosen for their ability to provide rich data and to extend or replicate theory. Theoretical sampling was particularly relevant in the context of this research as there was a small population to choose from and consequently informants were selected on the basis of being extreme situations and polar types, in which processes were easily observable (Eisenhardt, 1989). Informants were selected using theoretical sampling based on the extremes of involvement within the programme including those showing high levels of engagement and those without any interest. The number of informants was relatively low due to the small population size of certified suppliers and was dependent on the number of suppliers Synlait identified as extreme cases. Informants were identified for interview using these criteria by the Synlait Milk Supply Team Area Managers, Environmental Advisors and Lead With Pride Manager who all had regular contact with relevant suppliers. Ten farms currently participating and three farms not participating in LWP were interviewed to obtain the required data.

3.4.1.2 Interview Schedule

The interview schedule was developed to understand:

- The background characteristics of farmers
- Attitudes and perceptions of LWP
- Perceived behavioural control over adoption
- Normative beliefs surrounding programme adoption

The questionnaire was developed from the literature, utilising the diffusion of innovation, with the purpose of enabling the TPB/RAA framework for LWP adoption to be populated. The interview schedule contained two main sections, the first aimed at addressing the background characteristics of the farmer and the second their perceived practice characteristics. Section one therefore considered such aspects as: education; previous employment; time within the dairy industry; time supplying Synlait; current role and, farm characteristics (such as farm size, profitability of farm enterprise, ownership structure, stock

numbers, infrastructure, staffing numbers, production parameters and participation within special milk programmes such as that of a2 Milk² or Munchkins Grass Fed³).

Section two comprised questions relating to Rogers (2003) attributes of innovation – relative advantage, complexity, compatibility with the farm system, ability for programme requirements to be observed, trialability of the programme within a farming enterprise and risk posed by participation. Questions concerning relative advantage considered the perceived advantages, disadvantages, need for the programme and willingness to re-participate. Complexity sought to understand the difficulties faced with programme implementation and the means by which these were reduced. Compatibility provided understanding around the ease of access to participation and individual farms' need for a programme such as LWP. It also looked at the farms' existing compatibility with requirements and farmers' perceived confidence in the success of programme implementation. Observability explored the ability to witness the programme in practice and the degree to which others' perceptions influenced participation. Trialability questioned whether the programme had flexibility that enabled it to be trialled on a given farming enterprise. The risk questioning related to the risks that an individual and their business could be exposed to when participating within the programme. A copy of both the interview schedule for certified suppliers and non-certified suppliers is provided in Appendices 1 and 2.

3.4.2 Financial Implications

For the purpose of assessing the financial implication of adoption, only those requirements which could be directly related back to LWP Gold Plus implementation were considered in the study. These requirements were confirmed with the manager of the LWP programme and it was ensured that those farms involved in the evaluation agreed that these practices could be attributed to programme implementation.

² Synlait offers an a2 Special Milks Programme which requires suppliers to supply milk free of a1 protein, for use in production of products for the a2 Milk Company. Suppliers are paid a premium of 20 cents per kilogram of milk solids for being a part of this programme.

³ Synlait offers a Grass Fed Special Milks Programme which requires suppliers to meet a standard for supply, ensuring cows are exclusively grazed on a pasture and crop-based diet, with no feeding of grain, or feed not grown in New Zealand. The program is independently audited by a third-party accredited ISO/IEC Guide 17065 and suppliers are paid a premium of 25 cents per kilogram of milk solids for being a part of this programme.

The requirements to meet LWP standards and become certified are outlined in the Complete Requirements Booklet produced by Synlait Milk. The overview page of the complete requirements booklet is available in Appendix 3. Programme outcomes outlined in the complete requirements booklet are categorised by their ability to add value and how this value is added (Appendix 4 to 7). Requirements are classified as *either mandatory, quantifiable or non-quantifiable*. Mandatory requirements are those which are required of suppliers regardless of participation within the programme. These may be requirements of supply administered by Synlait or those from a third-party organisation such as a regional council or MPI. Quantifiable requirements are those which have a measurable parameter that is a direct result of the programme requirement. Non-quantifiable requirements are those which do not have an associated measurable parameter.

Where possible, farm records were obtained from three informant farms to ensure actual data of the measurable parameters, reflective of the changes in practices, were incorporated. Selection of farms for obtaining financial data was carried out utilising the same means as were adopted for interview selection, that is, they were theoretically sampled based upon their ability to provide the required data. The adequacy of suppliers' record keeping was an important consideration in the selection of informants to ensure the required data could be provided. A range of farms was again selected by the Milk Supply team at Synlait and from this three were chosen to provide their data. Informant study farms had to be willing to provide sensitive data relating to the profitability and performance of their farm. Some of the parameters required for the evaluation were not commonly recorded by farmers (for example, costs specific to weighing young stock). In these instances, estimates were obtained from industry data and/or the scientific literature. The methods for determining individual costs and benefits of LWP requirements with measurable financial implications are discussed in the following sections below.

Each financial implication has been presented to represent the average Synlait farm which is located within Synlait's supplier catchment (Figure 5). These farms are primarily located on the Canterbury plains, under irrigation, with some farms located in the general Culverden and Geraldine areas. The Sustainable Dairy Water Accord (SDWA) means Synlait collects

externally audited data on herd sizes and hectares. These 16/17 figures, along with Synlait milk production data for the 16/17 season have been utilised to inform the analysis. The average Synlait supplier produces 316,248kgMS, has a peak herd size of 723 and a farm area of 239.12 ha. The Synlait payout (including premium incentives) for the 16/17 season of \$6.30⁴ was used for any milk price related calculations. To protect the identity of the farms, data is presented at an aggregated average level rather than for each individual farm.

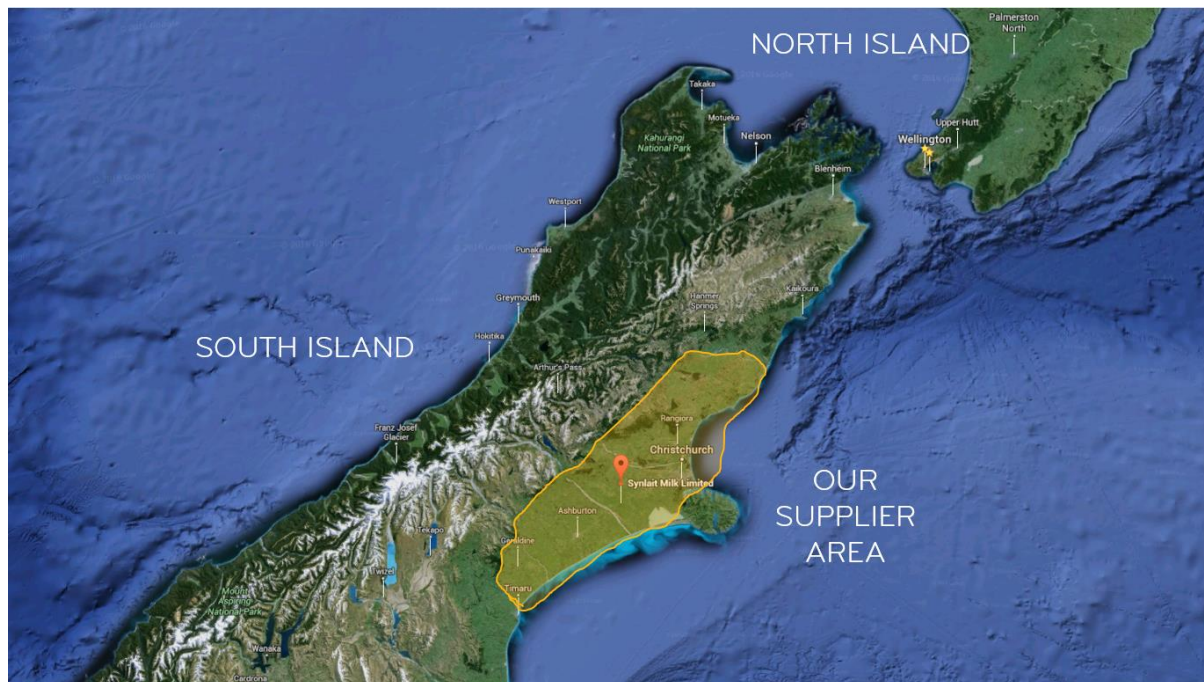


Figure 5 Synlait Supplier Catchment Area

3.4.2.1 Assumptions and Calculations

The following sections discuss the assumptions and calculations used for each pillar to determine the financial implication of LWP adoption at Gold Plus. The specific method for obtaining the financial implication of each assessed requirement is explained, due to there being varying data sources.

⁴ \$6.30 was the average payout. This included a base payout rate of \$6.16 and an additional average incentive and premium of \$0.14.

Environment

The environmental pillar requirements were classified (Appendix 4) revealing that many of them are now requirements of Environment Canterbury (ECan) rules and regulations. Many of the requirements are good management practices. The good management practices are applied by farms through the implementation of Farm Environment Plans as required by the ECan Land and Water Regional Plan (LWRP) Schedule 7.

Effluent Warrant of Fitness

LWP standard EP 4.7.1 outlines that “there shall be a system evaluation undertaken before the certification audit occurs by a suitably qualified auditor in accordance with the Effluent Code of Practice” (Synlait Milk Ltd, 2016, p. 18). The system evaluation report produced as part of the dairy effluent Warrant of Fitness (WOF) ensures that the system is fit for purpose and is capable of being compliant under a worst case scenario basis (Michael Edmondson, personal communication, December 17, 2017). The cost for this requirement was obtained from the Synlait Environmental Advisors who assist farms in completing this.

Planting

LWP standard EP 7.2.1 requires that “at least 10 m² of habitat or shelter planting per year with appropriate site preparation, watering and maintenance shall be planted annually, up to 5% of farm area, e.g. around farm houses, tanker track, calf barns, farm dairy etc.” (Synlait Milk Ltd, 2016, p. 28). All costs were obtained from DairyNZ before being discussed and agreed upon with the financial case study farms.

Farm Power Usage

LWP standard EP 8.1.2 outlines that “Fossil fuel and electricity use shall be benchmarked by tracking annual consumption. This will allow fuel and electricity use to be assessed in the future” (Synlait Milk Ltd, 2016, p. 29). Farm records of electricity usage were utilised to determine if there had been a reduction in costs since LWP implementation. The requirement to benchmark electricity more clearly, highlighted the opportunity to reduce costs in this area. The electricity reductions were averaged across the three farms, across three years to account for seasonal variations which have a significant influence upon the use of electricity in irrigation.

Irrigation Operator and Manager Training Course

LWP standard EP 2.3.1 requires that “at least one staff member achieves the Irrigation Manager Training Standard (from Irrigation NZ). This staff member shall be the person responsible for managing the irrigation systems on-farm” (Synlait Milk Ltd, 2016). Costs for this requirement were obtained from IrrigationNZ.

Primary ITO Effluent Course

LWP standard EP 3.4.1 requires that “at least one staff member achieves the Effluent Management Training Standard” (Synlait Milk Ltd, 2016). The cost of the effluent course was obtained from PrimaryITO.

Effluent Failsafe Device

LWP standard EP 4.4.3 requires the “installation of a fail-safe / alarm device for a discharge system that ceases pumping when the effluent system malfunctions”. These devices vary in cost, dependent upon the provider and the system it is required to be installed upon. This capital cost is an item which is required only by those farms which did not have these devices fitted. One financial case study farm already had a fail-safe device fitted prior to deciding to adopt LWP, whilst the other two could not accurately recall the price they paid to have one installed. Therefore, this cost may not necessarily be applicable to all Synlait farms. A LWP supplier, currently working through the certification process who had recently fitted a fail-safe device provided the cost of one of these devices. This cost was reality checked with Synlait Milk Environmental Advisors and financial informant farms to determine that it was an accurate reflection.

Excluded parameters

The environmental requirements listed below were excluded from the financial evaluation as the financial case study farms deemed them to be insignificant or unable to be related back to participation in LWP. In many instances these practices and their associated costs and benefits existed prior to LWP adoption. Suppliers did note that there may have been changes in these relating to LWP but deemed these to be minor.

- Cost of recycling

- Reduced costs of rubbish disposal
- Reduced cost in irrigation and effluent breakdowns due to proactive maintenance
- Reduced costs due to increased irrigation and effluent efficiency

Milk Quality

The benefits attributed to the milk quality pillar of LWP include reduced financial grading penalties and the milk quality premium incentive. Costs incurred include the requirements for an approved handler's certificate. The methods of assessment are detailed below.

Primary ITO Milk Quality Courses

MP3.1.9 requires that at least one full time member of the farm staff shall have passed the Primary ITO Milk Quality training course, both stage one and stage two and, in addition to this, one other person must have completed Stage One Milk Quality training. The cost of these courses was obtained through Primary ITO.

Approved Handlers

The approved handler's certificate as required by MP 6.1.8 is a certificate which permits someone who has been certified to handle hazardous substances and provide assistance to other people handling the substances (Worksafe New Zealand, 2017). Whilst this approved handler's certificate is a requirement when handling certain classifications of substances, it is not necessarily required by all farms. Despite this, the approved handler's certificate is included within the requirement of LWP and consequently has been included within the financial analysis of the programme. The cost for this course was obtained from various course providers.

Reduced Grades

The grading for milk quality parameters was assessed across the 2016/17 dairy season. All grading penalties (bactoscan, coliforms, thermoturics, inhibitory substances, somatic cell, freezing point, DDE) and associated costs (consequential tanker loss costs) were totaled for non-certified and certified suppliers. The total cost of grading was divided by the kilograms of milk solids produced by the two respective groups to provide the total grading cost per kilogram of milk solids. The difference between the two groups was calculated and the saved

amount attributed to the financial evaluation. Significant reductions in the key milk quality parameters require the application of education knowledge transfer and the motivation to remain is essential in achieving control and improvements (Green et al., 2007 as cited in More, 2009). Reduction in grading penalties relates to programme requirements that ensure there are established standard operating procedures (SOPs) relating to dairy presentation, pest management, milking machine and vat cleaning, milking routines, documented rubberware replacements and hygiene/pre-season checks required of LWP and the education and training provided through the Primary ITO courses.

LWP Milk Quality Grade Free Premium Incentive

A premium is paid monthly to incentivise high performance in milk quality. The two cents per kilogram of milk solid premium requires suppliers to be grade free for the month, maintain a monthly average collection temperature of below 7 degrees and achieve a bactoscan average of less than 10,000 (A+). This was assumed to be achieved by majority of farmers.

Excluded Parameters

Milk quality outcomes were classified (Appendix 5). Many of the programme requirements under the milk quality pillar are non-quantifiable or mandatory, through either the Synlait Supplier Handbook which details the standard conditions of milk supply or Ministry for Primary Industries NZCP1: Design and Operation of Farm Dairies. Many of these non-quantifiable requirements had their value expressed in interviews with certified suppliers, particularly with regard to milking procedures provided through the required SOPs. However, for this analysis they are excluded.

Animal Health and Welfare

The animal health and welfare requirements were classified (Appendix 6) revealing a number of quantifiable aspects. The following section discusses how requirements were quantified and the underlying assumption used.

Young stock live weights – gain in milk solids at first lactation

AP 3.1.1 requires that young stock (rising one and rising two year old heifers) are to be measured / weighed in order to assess performance against industry live weight gain targets

(Synlait Milk Ltd, 2016). New Zealand dairy cows have an average productive life of 4.5 lactations requiring an average replacement rate of 22% (DairyNZ, 2016). These figures, applied to farms data, were used for calculating the costs and benefits associated with young stock. A New Zealand study comparing the relationship between weight and subsequent lactation performance found there to be a response of between 0.32kgMS at lactation and 0.41kgMS for every kg of live weight a heifer was closer to target weight depending upon pre-mating/pre-calving weights and lactation (Table 1) (Lopdell & McNaughton, 2013 as cited in DairyNZ, n.d.). The gain in milk solids was calculated for both pre-mating and pre-calving at lactations one and two.

Table 1. Milk solid response (kg) for every kilogram of live weight heifer is closer to the target live weight (DairyNZ, n.d.)

Material removed due to copyright compliance

Young stock gain in 6-week in calf rate

Young stock weighing also returned an improvement in the 6-week in calf rate of young stock. Financial case study farms experienced an average 3% increase in their six week in calf rate amongst heifers from pre to post LWP adoption. Heifers found to be below the target live weight are known to have extended calving patterns leading in to their first lactation, resulting in economic impacts from fewer days in in milk and can even cause issues through subsequent matings (Brownlie, Morton, Heuer, Hunnam, & McDougall, 2014; Penno, 1997). The DairyNZ InCalf Economics of Reproductive Performance tool - version 2.0 was used to calculate the possible financial impact of this difference. It is important to note that other factors beyond LWP requirements may have impacted upon six week in calf rates.

Feed cost of young stock reaching liveweights

Having young stock reach their target live weight requires some cost in feed. Financial cost study farms varied in the required input to reach target live weights with some having to

increase feed and others having to decrease feed (i.e. young stock were over their target live weights). An average of 5kg had to be gained per heifer.

Young stock feed costs are very subjective in relation to the type of feed and the live weight at which the gain is required as young stock require more kgDM per kg of growth weight the heavier they get. Table 2 shows the dry matter intake required for 1kg of live weight gain in young stock against various starting weights. Financial case study farm data was utilised to calculate an average feed cost of \$0.33/kgDM⁵.

Table 2. Daily dry matter intake to achieve different rates of gain, relative to start weight (DairyNZ, n.d.)

Material removed due to copyright compliance

Cost of weighing young stock

Financial case study farms had varying means of weighing young stock. Whilst some weighed young stock themselves others had it as part of their grazing contracts. Either way there are associated costs, either by means of individual time and equipment required or increased grazing costs. For this study it was assumed that an external contractor was used to weigh young stock four times from weaning through to entering the milking herd. Costs were obtained from a local veterinary practice which offers a specific young stock weighing service (which some case study farms were utilising).

⁵ Feed costs were based upon financial case studies 2017/18 dairy season data

Reduced Lameness

AP 6.2 outlines three requirements relating to taking a preventative approach to lameness of stock. Data from financial case study farms was utilised to determine the financial impact of reduced lameness. Lameness is known for causing economic losses in dairy systems, due to reproductive failures, treatment costs, labour cost, reduced milk yield and subsequent diseases such as mastitis (Enting, Kooij, Dijkhuizen, Huirne, & Noordhuizen-Stassen, 1997). A number of studies have quantified the costs of lameness to an individual dairy farm (Bruijn, Hogeveen, & Stassen, 2010; Cha, Hertl, Bar, & Gröhn, 2010; Kossaibati & Esslemont, 1997). A more recent study of incidences of lameness utilising 43 South Island farms and a seven year work programme looking at the impact of lameness costed it at \$40 per case (Gibbs, 2010). For the purpose of this study a \$40 cost saving per cow was utilised which was conservative with other estimates of \$75 within the literature (Bruijn et al., 2010). Reduced lameness incidents will vary significantly for farms, dependent upon the infrastructure on which cows walk and the number of incidences of lameness on farm. Cost savings are only an indication based upon data from informant farms.

Reduced Clinical Mastitis

Clinical mastitis is a persistent problem in dairying worldwide with significant animal health and welfare concerns and has negative impacts upon milk production and fertility (Fabian, Laven, & Whay, 2014). Actual numbers of clinical mastitis cases were obtained from case study farms to determine the reduction. This reduction was then entered in to the DairyNZ SmartSamm calculator.

Reduced Death and Culling due to Mastitis

There may be instances where the management decision relating to clinical mastitis results in culling the animal (Halasa, Huijps, Østerås, & Hogeveen, 2007). Cases of culling due to clinical mastitis and number of deaths was obtained from case study farms. This was then entered in to the DairyNZ SmartSamm calculator to calculate the financial implication.

Reduced Somatic Cell Count (SCC)

Synlait pays a two-cent incentive at Gold Plus for maintaining a SCC under 150,000. This incentivises farms to reduce their SCC to this level and maintain it below the threshold.

Reduced somatic cell count has attributable savings through reduced costs associated with factors such as cost of drugs, veterinary services, diagnostic costs, labour, decreased milk quality and capital investments (Archer, McCoy, Wapenaar, & Green, 2013). Bulk milk SCC for the financial case study farms was obtained from Synlait's database and utilised to calculate the average reduction. The DairyNZ SmartSamm calculator was again used to calculate the cost saving from a reduction in bulk milk SCC.

Excluded Parameters

Financial case study farms experienced few, to no increases in the body condition score (BCS) of the milking herd. This was not surprising given the fact that Canterbury cows are typically well fed in comparison to other regions of the country meaning they tend to have stable BCS.

Pregnancy rates of heifers were excluded in the financial evaluation as the financial case study farms found there to be little to no change in empty rates amongst their young stock. Increased milk production from effectively managing feed on farm was excluded. Farms, regardless of participation in LWP are required to adequately measure their pasture production. Most farms complete assessments of their available feed and ensure cows are receiving the required amounts to maintain milk production expectations. Management of feed and its subsequent impact upon milk production is also significantly impacted by factors beyond the programme, such as weather. It was therefore considered unreasonable to include this factor as one that could have implications upon the financial feasibility of programme adoption.

Social Responsibility

The social responsibility pillar incorporated a number of requirements that do not have an associated financial cost or benefit. Some were simply required within New Zealand law however, farms recognised that they were often not meeting these to the required standard.

First Aid

The only cost incurred under the social responsibility pillar related to the requirement for there to be one person on farm trained in first aid. Costs of first aid courses vary and an average of the cost paid for the three informant farms was utilised. These courses require

renewal at varying periods dependent upon the provider, however it has been considered a yearly cost for the purpose of this study.

Excluded Parameters

Almost all aspects of the Social Responsibility were deemed to be non-quantifiable and were therefore excluded. Whilst several farms recognised they thought they had higher staff engagement and that this perhaps resulted in higher staff retention, there were too many other variables that influence this.

3.5 Ethics Approval

As this research involved the collection of primary data, prior approval from the Lincoln University Human Ethics Committee was required. The interview schedule and supporting application documentation including acknowledgment of third-party research were submitted for review and approval by the committee. Approval was granted on September 22nd, 2017 (Application No. 2017-41) (Appendix 8).

All informant data was kept anonymous throughout the research and as part of the approval process this must be maintained in any further publications. Prior approval to interview was acquired through written consent and participants were informed of the recording of interviews. Synlait Milk also discussed any involvement with its suppliers.

3.6 Data Analysis

Once the interviews were undertaken they were transcribed to allow for coding and interpretation using inductive methods of analysis to help identify themes of consistent responses among the research participants (Turner, 2010). Coding allows for the concepts, themes, events and topical markers to be systematically labelled so they can be examined as individual data units that refer to the same subject across all of the interviews (Turner, 2010). Coding identified themes from within the data and thematic analysis was used to distinguish patterns that occurred amongst the participants' perceptions of LWP (Schreier, 2012). Qualitative content analysis provided the method for systematically describing the meaning of qualitative data (Schreier, 2012) and determined the significance of a given theme, which

gave recognition to both the key themes expressed by interview participants and the frequency with which they were mentioned, both by an individual and by the entire participant population. The content analysis adopted a mixed inductive and deductive approach. Forman and Damschroder (2007) identified that it is common for content analysis to employ a combination of both inductive and deductive coding as deductive coding allows for initial structured categorisation whilst the inductive method allows for the opportunity to identify new codes. This required the development of an initial categorisation matrix in which data was reviewed for its contents and subsequently coded on the basis of corresponding to an identified category or exemplifying characteristics associated with the given category (Polit & Beck, 2012 as cited in Elo et al., 2014). Deductive categories were constructed from the RAA/TPB approach (Figure 3) to allow categorisation of concepts identified through interviews against the framework. Some sub categories were developed under the deductive categories based on identification throughout the coding process (inductively) to allow for exploration of concepts specific to the LWP program. The coding was trialled and evaluated, by recoding some data to ensure it was consistent, and concepts were accurately assigned to the correct corresponding category.

Following development of the deductive coding matrix, preliminary coding occurred to identify some new topics that arose within the data set. Using inductive coding within the process was essential for understanding the relative importance of a given theme to an individual participant by reflecting the way informants made sense of their circumstance (Forman & Damschroder, 2007). This was further enriched with some narrative analysis which emphasised interpretation and context within participants' responses. Furthermore language was interpreted to indicate importance, respective to the participant (Forman & Damschroder, 2007) Frequency indications were utilised to determine the number of instances a particular concept, theme or topic arose amongst participants. Incorporating frequency indication within the qualitative content analysis allows for an assessment of evidence within the data set and supports internal generalisation of research claims and characterises the diversity of beliefs and perceptions amongst the participants (Maxwell, 2010; Schreier, 2012).

A schematic budget was developed to analyse the financial implications of adopting program requirements (Figure 6). There are costs and benefits associated with the implementation of LWP.

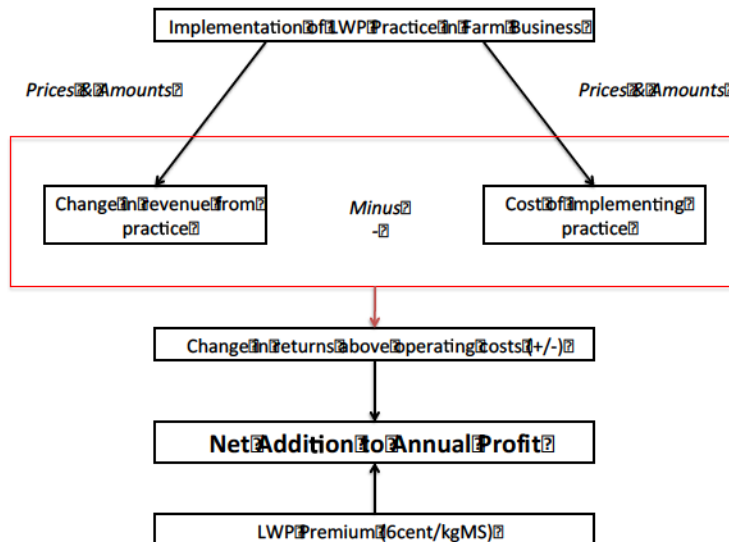


Figure 6 Partial budget (schematic) of the annual economic effect of Lead With Pride Adoption adapted from Wossink & Osmond, 2002, p. 214

Prices were calculated for the given requirements with the cost of practice implementation subtracted from the increases in revenue to provide a change in the return above the farm operating costs. This factor provides a representation specifically relating to the increases from changes in farming practice to align with the best practice objectives of LWP. This change in return, added to the LWP premium of six cents per kilogram of milk solids, provides a net addition to the annual profitability of the farming enterprise.

3.7 Research Approach Summary

The research was broken down into two parts, which together help provide insight into the effectiveness of utilising farm assurance programmes as a means for enabling best practice within the dairy industry.

The research sought to understand farmers' perceptions and motivations for adopting programmes and perceived advantages and disadvantages with undertaking farm assurance programmes. The diffusion of innovation theory provided a useful framework for guiding the

factors that influence the behaviour of farm assurance programme adoption and incorporates factors that highlight the advantages and disadvantages associated with programme participation. The research adopted a case study of Synlait Milks LWP program utilising a qualitative research approach. Primary data was gathered through semi-structured interviews with Synlait farmer suppliers. This data was analysed utilising qualitative content analysis methods, including systematic coding of data and considered TPB constructs in the subsequent analysis.

To assess the advantages and disadvantages associated with whole farm assurance programme adoption, an analysis of the financial implications was conducted. Farm records, literature and industry data were utilised to gather the data required to assess the net return to farmer suppliers participating within the programme.

Chapter 4

Results

This chapter presents the results, following the analysis of the interview data and financial evaluation. Section 5.1 presents the findings from interviews while section 5.2 focusses on the financial evaluation. As some of the comments from interviews provided support for assumptions or findings within the financial analysis, section two often references data obtained throughout the interviews.

4.1 Factors Influencing Programme Adoption

Based on the literature a conceptual model was populated utilising the themes revealed through interviews with suppliers (Figure 7). Themes were categorised into Rogers (2003) five attributes of an innovation which influenced the various beliefs.

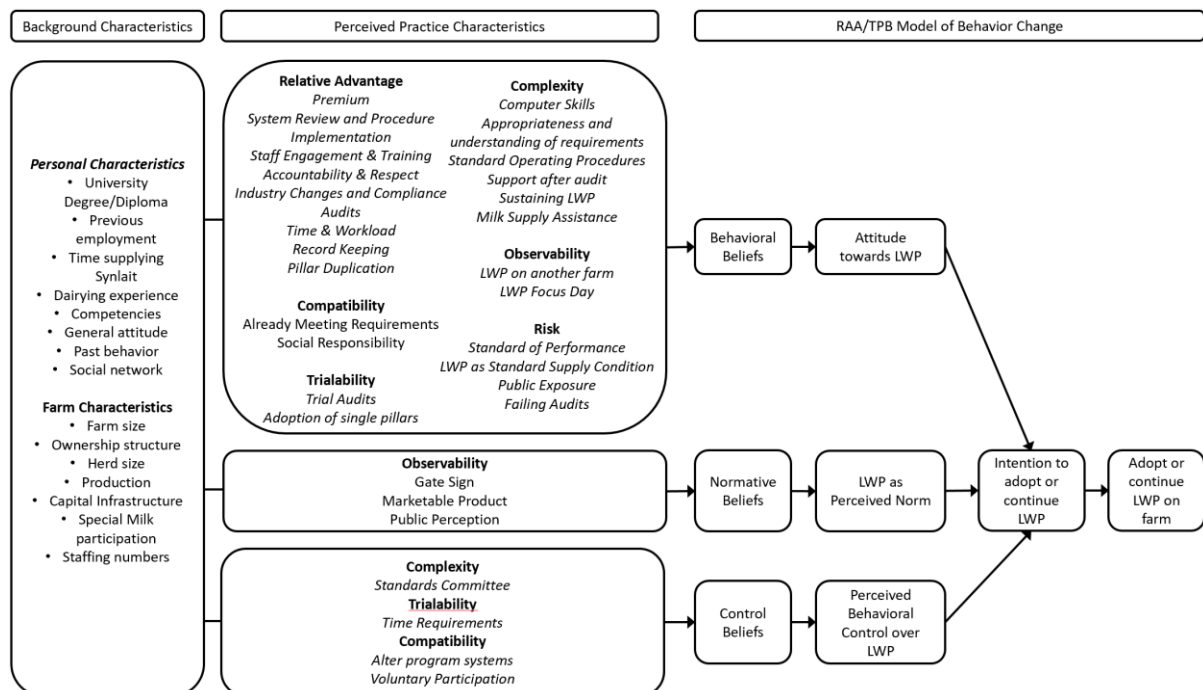


Figure 7 Populated LWP adoption framework adapted from Reimer et al., 2012, p. 119

4.1.1 Background Characteristics

Background characteristics were obtained from suppliers at the beginning of interviews to develop an understanding of whether any of these factors may have been influential, or common amongst participants (Table 3). Individual background characteristics are not presented for each participant for reasons of confidentiality.

Table 3 Summarised background characteristics of interviewed suppliers

Background Characteristic	Interviewed Supplier Result
Average Farm Size	228.23ha (Total) (Range: 162ha – 450ha) 216.41ha (<i>Effective</i>)
Ownership Structures	<i>Owner/Operator: 5</i> <i>Sharemilked: 4</i> <i>Contract Milked: 2</i> <i>Corporate Owner (Manager): 2</i>
Average Production	285,326kgMS
Peak Cow no.	688 Cows
Shed Type	10 Rotary Sheds 3 Herringbone Sheds
Average Staff Numbers	3.8FTE
a2 Farms	1
Grass Fed	2
Average length of LWP certification (<i>excludes non-certified suppliers</i>)	2.32 years
Length of time supplying Synlait	7 years
Length of time dairy farming	14.8 years

The majority of participants had some form of higher education (beyond secondary school), with most having attained an agriculturally related degree. Several suppliers had been involved in consulting roles or had been sheep, beef or cropping farmers prior to dairy farming. Only one participant had come from previous employment entirely non-related to agriculture.

Background characteristics were found to impact upon adoption, as they influenced a supplier's ability to implement the programme or achieve the same relative advantage as others. For example, a smaller farm may have struggled to meet the requirements for effluent storage and did not have the capital available to install a new system. This was evidenced by a farmer who had not adopted LWP.

“We’re not doing it. We can’t do it. We simply don’t have the infrastructure to meet requirements and it just wouldn’t make sense for us to spend thousands of dollars upgrading. We just won’t make that back on the premiums. I reckon that’s the biggest thing stopping people from getting on board” (Supplier L).

4.1.2 Attitude towards LWP

An individual’s attitude towards LWP was characterised by their perceptions as to its relative advantage, complexity, compatibility, observability, trialability and risk. The main themes identified as a result of data analysis under each of these is discussed with examples provided.

4.1.2.1 Relative Advantage

The predominant influence upon an individual’s attitude towards LWP was the extent to which they perceived there to be a relative advantage in participating in the programme. Relative advantage was characterised by the perceived advantages and disadvantages associated with programme adoption. Key themes identified through analysis of the interviews, relating to relative advantage are discussed below.

Premium

A key advantage of the programme was the incentive premium paid which many noted became more significant as the standard base payout rate decreased (i.e. the margin of the LWP incentive payment increased).

“I mean 6 cents, when you’re getting bugger all is actually quite useful” (Supplier I).

Majority of informants recognised that, although the premium was a key advantage and essential in compensating for the required effort, it was not the predominant driver of program advantage:

“I certainly wasn’t driven by the premium. But the premium needs to be there for the amount of work” (Supplier D).

“You can’t say you do it just for the money, because we didn’t just do it for the money, but the money’s obviously helpful” (Supplier F).

Despite this many noted that the premium should be higher to more adequately reflect the required effort with many suppliers displaying a negative attitude towards the current premium of six cents:

“I think in terms of the input that we have to stay accredited with Lead With Pride and to stay accredited with Grass Fed, yeah, night and day difference. So when you think of the little bit that we do and the big payback that we get from Grass Fed, and it’s kind of the opposite with Lead with Pride” (Supplier J).

Just over half of the informants recognised that the incentive payment should not necessarily compensate for all the effort required as there are a number of other advantages that help with recovering the time and financial investment involved to become and maintain accreditation:

“The premium’s really important, don’t get me wrong, but we’ve certainly got as much value out of it from being part of the programme, as we have had out of the premium” (Supplier H).

However, there was a general expectation, that once a market could be obtained for a product that was attached to the LWP brand, suppliers expected there would be an increase in the premium paid, to reflect the additional profit that Synlait would obtain:

“We like the concept of it being able to be developed into a product of some form and being able to be rewarded financially accordingly” (Supplier D).

System Review and Procedure Implementation

Almost two thirds of suppliers highlighted the advantage obtained through having to review their farm system and identify areas for improvement:

“When we’re putting it together, or when we go through the audit, we go, ‘Actually is this really working really well?’ And if not, ‘Why not, and how can we change it to make it work better?’” (Supplier A).

“...so it’s identified the areas that we needed to do a bit more work” (Supplier E).

“It also keeps you on the ball yourself. It keeps you monitoring what you’re doing and looking at different ways of doing things” (Supplier C).

The programme enabled informants to foster a continuous improvement culture in which they consistently aimed to improve elements of their farming practice. Notably important was the facilitation of staff participation in the continuous improvement culture:

“It’s a good one to take through with your team and say, ‘Look this is what we think best practice is, have you guys got any good ideas on that?’ and it gives them the okay to raise their hand and say, ‘Have you thought about this?’” (Supplier G).

It was noted that the requirement to implement standard operating procedures and systems within farming practices gave significant benefits because it meant everyone was operating in the same manner and knew what was required of a given task:

“It has standardised our operations, so gave us very firm procedures and policies, and has meant that we’ve had to tighten up some of those things, which is good” (Supplier F).

“It’s definitely improved our processes and policies, in that it has strengthened it up” (Supplier I).

Three quarters of informants also noted that having procedures in place meant they were able to leave the farm and it would continue to operate to the same standard:

“...your life actually gets easier at the end of the day, because you’ve got systems in place. I can leave this farm today and the guys will just keep going. That’s a good thing, you see, everything’s in place” (Supplier H).

Whilst implementing procedures and systems for farm operation was identified as a key component of the relative advantage, most farmers found the main benefit surrounding procedures related back to the social responsibility pillar:

“Staff management, it’s certainly a lot easier if we’ve got the procedures in place and the manuals there for training and everything else” (Supplier D).

“It’s having systems around managing the staff information with regards to their employment. That’s a big advantage” (Supplier E).

Staff Engagement and Training

Informants highlighted the benefits obtained through staff engagement such as investing more time in personal development and allowing staff to be involved in a number of farm processes:

“Through the performance and learning and training matrixes and that, and the goal setting, I think they can quite clearly see how invested we are in them into achieving their goals. And so because we go over those regularly, I think we’re getting retention and their improvement, their growth as well” (Supplier G).

There are requirements of farm staff within the programme that help to ensure staff engagement. This includes the involvement of staff in audits requiring them to participate in questioning:

“I think because in the audit it requires staff questioning, I think you can’t get away with only the top running the programme. Like it just wouldn’t work, you’d fail in those questions and they’d quite clearly see that there’s a disconnect between the two. Because they need to know what you’ve set down as this SOP, or the certain

training and stuff that you're doing. So it quite heavily involves the staff as well"
(Supplier B).

"It's an incentive for the staff too to keep things right, because they've got the light turned on them when it comes to audit time" (Supplier A).

The facilitation for staff training was acknowledged by suppliers as being a unique advantage. Suppliers gave reference to how simple training new staff became through the adoption of LWP and alluded to the benefits of having all staff trained to the same standard:

"It means that anybody could come on and basically they should be able to find the piece of data they need to go and do something. So it's helped with training" (Supplier F).

"All the training given to people is better and so therefore you should be getting a productivity increase right across the range" (Supplier I).

Accountability and Respect

A number of farmers discussed the advantages associated with accountability, achieved through participation in the programme. Accountability related to different parties involved within the programme including farm staff but was particularly beneficial for share-milked or contract milked properties where performance accountability could be demonstrated to the owner. This theme was particularly prevalent amongst corporate owned farms in which the primary operator (e.g. farm manager) felt LWP provided a good means of demonstrating high performance to their owners. It also included the importance of accountability placed upon the farm owner to ensure they were looking after staff in a best practice manner:

"It just means that, especially when you're an absentee owner that you can have confidence in your operation and it just gives the managers and that a bit of direction I guess. Best of all, we all know where we stand" (Supplier D).

Accountability was of significance to suppliers in the context of the pressure from wider society for better practices regarding environmental and animal welfare factors. Suppliers felt they had a duty to prove to society they are operating in a more sustainable way and were conscious of animal welfare:

“...it does give proof positive that things are being done as they’re supposed to be being done” (Supplier F).

“I just think it needs to be done so that we can not only say that we are farming to a certain standard, but actually show, actually prove it, demonstrate that we actually are” (Supplier C).

Farmers also raised that, due to the accountability through the programme, they felt they earned respect and trust from Synlait:

“I think it gives you a good sort of rapport with the Synlait people too. If you’ve proven yourself to be able to do it, I think you get a bit of mutual respect there, like it goes both ways” (Farmer D).

Industry Changes and Compliance

One of the key benefits highlighted throughout the interviews was that the programme enabled farms to be proactive to changes within the industry, particularly those that eventually became compulsory:

“We seem to be two steps ahead of everybody else, as far as the changes coming up” (Supplier A).

Suppliers also acknowledged that the programme helped them to maintain their regulatory compliance and that through participation they could be assured they would consistently be meeting the numerous regulations imposed upon the industry. This was particularly important to a number of suppliers as they found there were a large number of regulations affecting them. By partaking in LWP many noted that it was helpful in bundling all of these

regulatory requirements into one, to ensure compliance was being met throughout the farming enterprise:

“Yeah compliance, there’s no issues. It’s all part of the deal, like everything’s all in one. The whole thing is a package deal” (Supplier A).

“Compliance. That’s huge, that’s probably the first and foremost advantage. It just helps us out so much around the compliance side of it. If we’re doing Lead With Pride we know we’re meeting all things” (Supplier H).

LWP provided assistance in meeting the requirements for farms to have a Farm Environment Plan⁶ (FEP). Suppliers were pleased that they were not required to have a separate FEP audit and that by being LWP certified they were meeting all council requirements. This extended to the satisfaction suppliers experienced in the reduction and more relaxed compliance monitoring they received from Environment Canterbury, given they were a part of LWP:

“It puts us ahead of the game in terms of the farm environmental plan for a start. Just ticks all of those boxes” (Supplier D).

“Well we have to have a farm environmental plan in our area and so I have to have it with somebody. I could sub-contract it to somebody else but I need one, and this meets the requirements for this, and I’m very happy with that” (Supplier F).

“That is one of the advantages to the whole programme, that Environment Canterbury is allowing the Lead with Pride pillar to be your compliance monitoring mechanism which is great, we get sick of having so many different parties come out to cast their eye over what we’re doing. People are starting to see that if we’re doing LWP, we’re doing things right – the best we can anyway” (Supplier B).

⁶An FEP is a plan farmers use to demonstrate how they are achieving good management practice on farm. The plan has specific requirements to meet the Environment Canterbury Land and Water Regional Plan LWRP rules.

Audits

Suppliers outlined that audits were a major disadvantage of the programme, due to the stress they caused and the amount of time they took to complete. This was a deterrent for all non-certified informants. However, they also acknowledged that they were a mandatory part of the programme to maintain its credibility and that they were just becoming a component of modern farming:

"We've only had one and it was a bit stressful, but we only had a week's notice and we got 380 out of 400. It's like any of those things, the more stress the more reward, to be fair, and great people to deal with" (Supplier D).

"The time it takes to do the audit is probably the biggest disadvantage" (Supplier M)

"That first audit was a bit nerve wracking, because it's a fairly big book and they could pick at anything they want to, and a lot of the stuff, I thought 'have we covered this off enough?'" (Supplier A).

"But audits are just going to happen anyway, like in the future, whether you're accredited or not, so we don't see it as to much of burden" (Supplier G).

In addition to this, suppliers were pleased that LWP allowed them to have a number of audits brought in to one:

"It streamlines everything. It just becomes part of your inspection, your yearly process" (Supplier A).

Audits were also acknowledged as being a useful learning tool for the farms and that the feedback provided can allow for continuous improvement:

"Auditors have to be tough and thorough, but I think they are more constructive when you finish. They sit down at the end and give you a few more tips of things that you

could do better and that sort of stuff, and that's what – I mean shivers, that's why we're all here, to do a better job than what we did last year" (Supplier B).

"They need to do two parts I think, they need to be absolutely thorough and sure that they've done their audit, but when they've finished it they could actually help in an educational way and say, 'These are the areas you can work on and this is what I think you could do', which they do now" (Supplier F).

Time and Workload

The time required to compile all the evidence and the subsequent time required to maintain compliance with the programme standards was a major disadvantage to suppliers. However, most understood that this was just a part of participation within the program and that after some time it just becomes a routine part of their farming system:

"I mean you've got to put time aside to do it, that to me is probably the critical thing when talking disadvantages" (Supplier J).

"...as far as the staff go, the mind-set can be, it's extra work" (Supplier E).

"I think the time's pretty good. As long as you're consistent and you build it into part of your routine, it's no problem. It's just like getting out of bed in the morning, you have breakfast. Well it's the same with Lead With Pride, don't really see it as being an issue really" (Supplier B).

"There's a lot of work. There's been a lot of work and a lot of time go into it. We probably put more time into it than what value we've extracted money wise. But then we're prepared – we've taken that on and we're prepared to do that" (Supplier C).

Record Keeping

The extent of record keeping required to be part of the programme was viewed by many of the interviewees as a major disadvantage and a barrier to adoption amongst non-certified

suppliers. Suppliers also had difficulty in determining where individual records should be kept:

“A disadvantage would be that in terms of recording and having some of the evidence, there are probably bits of it that could be done better” (Supplier G).

“The biggest amount of work is working out how you’re going to do it and how you’re going to monitor it, and how you’re going to keep the records. Because there’s keeping records and there’s keeping records” (Supplier J).

Some suppliers suggested that there could be better systems for keeping records, with a number referring to the desirability of a mobile application that could facilitate movement away from paper copies which had to be kept in one central location:

“... with technology these days, it would be far easier to say, have an app or something on the phone that information could get sent directly to, while you’re out there doing something, versus having to keep it somewhere on paper to then show and pull out at the audit” (Supplier G).

“We still record everything largely on paper and then transfer it to the computer so we’re double scoring things. Something on the phone so we could record as we go and everyone could enter at once would be nice” (Supplier C).

“We take our procedures down the shed and we leave the folders up here for the records, only because that’s not such a good place to leave them. But it means the men have got to come up here when they do, or I take it down actually, if they need to fill out a particular section” (Supplier H).

However, for nearly two thirds of informants the main concern surrounding record keeping was a struggle to understand the value that was extracted from keeping records which made it seem like a box ticking exercise:

“Synlait haven’t met the full potential of how we can deliver the information, so the people get the right stuff at the right time and actually use it. So there’s still gains to be made, I guess” (Supplier D).

“A disadvantage probably is the amount of tick boxing you have to do, but probably in the long run it works” (Supplier C).

“I have always kept records in the form of a diary, and I still find that I go back and check my diary regularly. Past events, seasonal changes, etc. I don’t find myself going back and checking what has been done and recorded with Synlait, with the Lead With Pride programme” (Supplier B).

However, suppliers did note that keeping records enabled them to have sufficient proof of practices and that this carried significant value when trying to demonstrate their compliance with Environment Canterbury consents (e.g. consent to spread effluent):

“Environment Canterbury came out one day and we’d put our effluent out and they said, ‘But you’ve just had all that rain, you should be not putting it out,’ and we’d actually looked on the moisture meter to see where our moisture levels were before we’d put it out, so we were able to say, ‘Well actually it is acceptable’” (Supplier E)

Some suppliers also recognised benefits in keeping records and the ability to look back at progress and quantify their practices:

“...we’re recording it all now and then we can look back and see where we’ve been. So it’s just an accurate record keeping of everything that happens on the farm, and then I can make some decisions based on what we’ve done. Yeah, it’s quantifiable, that’s number one, I suppose” (Supplier B).

Pillar Duplication

Informants noted that organisation of LWP components was often a disadvantage and felt that there was a significant amount of duplication amongst the various pillars. This was a

concern when keeping records and meant that they found that interest and engagement in the programme were often lost as they felt they were constantly repeating themselves:

“It’s been a difficulty in terms of change, well it’s hard to find stuff sometimes, I find that you can’t remember where things are, because some places it might occur in more than one place” (Supplier A).

“There’s a lot of double up. We find that one thing can cover two if not three pillars and that just makes it confusing. You don’t know where to put records if they don’t go in the records books, stuff like invoices. Say for example my feed declaration is that environment or animal health and welfare? Its small things like that, that cause a lot of frustration” (Supplier J).

“...it’s actually harder to find stuff. Like before I knew where all my consents stuff was and it was all there, and when you got a, like we had a backflow prevention test done the other day for our Nutridose and it would have normally gone in the consents section, now does it go into the animal health, or does it go in the environment? I think we could have a better index system as to where stuff was stored because it can be stored in different pillars” (Supplier E)

However, suppliers recognised that the SOPs were well structured which assisted with their composition and made it easier to find the required document when needed:

“...they had a blank template when we did it, I don’t know whether they still do, with just a few headings on it and that was very useful to keep your target, keep you focused, and so you didn’t duplicate some areas (Supplier F).

4.1.2.2 Complexity

Complexity reflected the suppliers’ perceptions of the programme’s complications and aspects that made implementation difficult and provided understanding of those factors that made programme adoption simpler.

Computer Skills

For many informants a major complexity was their computer skills. This was primarily related to the use of word processors to develop their SOPs with many commenting that typing speed was a significant hindrance. Moreover, Dropboxes were an unfamiliar concept for most suppliers prior to adoption and created a complexity when working towards certification:

“Just computers, like I’m no good on computers. So you have to be computer savvy to get through Lead With Pride. So you either have a wife or a partner who is, or you are, if neither of you are savvy you need some help, it’s as simple as that” (Supplier B).

“Yeah, I struggle, I’m hopeless. The Synlait person made it, just in the simple stuff that they could do, just cutting and pasting and pictures, and here and there, I mean I’d just get that pissed off I’d give up. No, definitely the support there, we wouldn’t have got anywhere near finishing if we didn’t have that “(Supplier J).

“I’m old relatively, so computers and some of those, and the Dropboxes and things are a new language to me” (Supplier E).

Appropriateness and Understanding of Requirements

Suppliers noted that they often found the administration of the programme relating to some of the requirements was not necessarily best suited to farming enterprises and suggested that this was influenced by the fact the programme was driven from within Synlait and did not always incorporate the requirements of a farm:

“Sometimes there’s that little disconnect between what the factory thinks is right and what the farmers think is right. Say, for example, like the training matrix I don’t think it’s really fit for purpose. It could be a lot better, a lot simpler” (Supplier G).

The simplicity of the requirements and the ability to understand their technicalities were critical influences on the perceived complexity of the programme:

“The harder they (requirements) are, or the more confusing they are, then the less likely you are to do them” (Supplier E).

Contrary to this, some suppliers did credit Synlait with having requirements that were appropriate to put in to practice, both incorporating the need to deliver on best practice performance whilst simultaneously working with existing farm systems:

“...behind all these quality assurance programmes there’s got to be a bit of common sense. It’s all common sense driven but you’ve just got to record it somehow or put it into practice somehow. Lead With Pride works because Synlait are pretty knowledgeable right through really and they’re quite practical people and that’s reflected in the programme” (Supplier A).

Informants also liked the referencing in the complete requirements (the book that provides the standards and evidence required for LWP) to additional resources that could help to understand and explain the requirements as well as supplement them with additional documents to meet programme requirements:

“...in each pillar there was references to things where you could get information that you needed that was relevant to that section. So the people stuff, if they didn’t have a good example say in Lead With Pride on their documents, it would say like, ‘Go to DairyNZ website and you can find this.’ And that was really handy because there was some stuff that’s already out there in the industry that you don’t have to duplicate, so why would you create your own if there’s something out there already” (Supplier G).

Standard Operating Procedures

Nearly two thirds of certified suppliers found that the SOPs created complexities for them due to the amount of work required in pulling together the necessary details. They also often found it difficult to transcribe many of the processes into an understandable format:

“Now we had the SOPs, they were quite demanding too, going through the SOPs and everything but yeah, SOPs are a lot of work, there’s no doubt about that” (Supplier B).

“There’s a lot of detail goes in to those SOPs. It’s really hard to know how far to go with them – what do you include, what don’t you include? Pulling them together is a hell of a lot of work and they’re pretty wordy, also writing down exactly what you do, it’s not always easy to explain” (Supplier H).

For many, formatting was one of the most difficult parts of developing the SOPs. Informants found that although they had the required knowledge about their farm, transcribing this and formatting it to include pictures for explanation was complex. However, many noted that the templates proved by Synlait made this process easier:

“The templates that Synlait give you certainly make writing them lot easier. Like you just have to fill in with all of your information so that saves a bit of time and means it’s all neat and tidy” (Supplier J).

One farm also noted that the SOPs were not perhaps the best means of presenting information as written English was often a struggle for many farm workers either due to a lack of education or the fact that English was a second language. Many also noted that the SOPs were just pages of text and it was difficult for staff to remain engaged and read them in their entirety:

“There’s a lot of stuff in some of those SOPs and even the Kiwis that come straight from school aren’t so inclined to read, and that’s why they’re going farming. So perhaps it could be presented in different tiers” (Supplier G).

Support After the Initial Audit

Support following the audits was identified as a weakness within the programme and added to the complexity of trying to adopt the system into the everyday operation of the farm. Many suppliers felt as if they completed the audit and were then left in the dark, with there being very little follow up. Most noted that they did not expect to be entirely guided throughout the programme but thought it was important there was detailed follow up reasonably soon after the audit to discuss what issues arose and how these may be remedied:

“... I think, you get accredited and then that’s it. You hear nothing after you’re accredited and you’ve got the paper work. Some follow up to make sure you understood what was required of you and go over any issues that arose in the audit is really needed” (Supplier J).

Conversely, one supplier did comment that they had received some assistance following the audit and mentioned that this was of considerable help:

“They (Synlait Milk Supply team) helped afterwards, there were a couple of things that we needed to get sorted and they helped with that. We really needed that support, just to keep us on our feet after the audit so we were fully up to scratch and could move on to living with LWP going forward” (Supplier F).

Sustaining LWP and Maintaining Records

Sustaining the LWP programme once accredited was identified as a key complexity throughout the interviews. Beyond the support required following an audit, suppliers suggested they would like to see more ongoing support similar to that which they received prior to certification, yet on a less frequent basis:

“Maintaining it all the time is quite tough, so some sort of system around a check-in one or two times during that first year is really needed” (Supplier B).

“It’s probably almost a good idea that there’s a phone call or two phone calls, a phone call within the next six months at least to say, ‘How are you getting on with your Lead With Pride?’ ‘How are you updating it?’ All that sort of stuff, and just because otherwise if it gets out of mind it’s like everything, you finish it and you’re like, ‘Yeah, get out, chuck my paper work out, I don’t need it anymore’” (Supplier I).

Seven of the ten certified farms recognised the primary complexity with sustaining LWP within their farm operation was keeping records. Carrying out the physical practices was largely part of routine and became a standard task, however recording for many was a new

concept and one that was difficult to remember and keep up with. Suppliers found that meeting requirements for their second audit, having put LWP into full practice on their farm was quite different to having to meet requirements of their first audit in which a number of items were not assessed as LWP had not been in practice for a long period of time. There is a requirement for a structured means of support to ensure they were not overlooking any critical parts of the programme, particularly in their first year of certification:

"I think what they need is like this quarterly, maybe that's too much, but it's like a quarterly checkpoint of, 'Have you done this?' Or, 'Have you remembered to do these things?' Because once you're past this point its kind of too late to go back and record those things" (Supplier I).

"It'd be beneficial to do the audit and maybe offer a bit more support maybe four and eight months down the track in that first year just to have everything operating right" (Supplier B).

Milk Supply Assistance

Every certified supplier interviewed acknowledged that the support they received from members of the Milk Supply Team leading up to the audit was essential. This support was required to ensure they stayed committed, understood programme requirements, were reassured of their performance against programme requirements prior to the audit and to ease the burden of a number of complexities that were presented throughout participation in the programme, particularly a lack of computer skills:

"Synlait's fantastic – two of them particularly. Brilliant support. It really was a bit of a no brainer when you look back, a lot of work, but the support they gave for something that's going to cost them ultimately to pay the premium, and puts us in a better stead going forward" (Supplier D).

"...having the support from the Synlait team, I think that's important for people to start with because when you get your outline of what you've got to, you think, 'Holy shit.'" (Supplier C)

“The Synlait guys were really helpful in compiling the SOPs, the fella that came out was bloody helpful, so it wasn’t too bad. I mean there’s a fair bit in it, but it was okay” (Supplier I).

“Old age and computer illiteracy. I mean just some of the modern stuff. My wife’s a very good typist but Dropboxes and some of those sort of things were just a bit hard for the old fella to sort out. But to be fair, the help from the Synlait team solved that problem” (Supplier B).

Half of the certified suppliers noted however that the level of support they received was to an appropriate standard in that the Milk Supply team did not complete the whole programme for them:

“they got us over the line with the SOPs, made sure we were heading in the right direction and then left us to it, which is their job” (Supplier B).

“To be fair, like the first audit that you go through, or your initial audit, the supply team are here. Well we had the supply team here for us any way, they might be just looking after the old fella, and they were real good. But they’ve got to be careful that they don’t – they were careful at the time, they weren’t driving it to make it better than it was, because that’s not the object of the exercise, you either pass or fail” (Supplier F).

4.1.2.3 Compatibility

Compatibility related to the programme’s ability to work in with the farms’ existing systems and the extent to which they had to alter their operations to meet the requirements of LWP.

Already Meeting Requirements

Many suppliers noted the existing compatibility of the LWP requirements within their farm systems and that they were already meeting a number of requirements:

“Doing the actual – the changes to the farm were done, a lot of them anyway, it wasn’t an issue” (Supplier E).

“What made it easier? The fact that we were doing most of the stuff already” (Supplier C).

“When you sit back and look at it it’s just things you’d probably be doing anyway” (Supplier A).

Nearly all certified informants were already meeting a number of the programme’s requirements; however, most suppliers acknowledged that it was the formalisation of procedures and the recording of their practices that were the notable changes:

“...and it’s just those – I mean it was just formalising what we were already doing. We would have regular meetings, chats with the staff, but then we had to formalise it to a learning and performance meeting” (Supplier C).

However, once again the programme’s structure and organisation compromised the ability of the programme to be compatible with the supplier’s system. For suppliers they found the way in which the programme was delivered, mainly the complete requirements book used to govern the programme difficult to follow. Referring to the organisation and delivery of the programme one supplier noted:

“I don’t think it’s really fit for purpose. It could be a lot better, a lot simpler” (Supplier E).

Social Responsibility Requirements

For over half of the certified informants the largest change within their farming operations was those elements required of the social responsibility pillar. Suppliers recognised that they were already practising many of the requirements of the animal health and welfare, milk quality and environment pillars and these often just required implementation of small

changes, primarily that of record keeping. However, the social responsibility pillar was identified as requiring a number of changes in practices and the implementation of a number of new processes:

“We have changed quite a bit with the staffing because we always had the contracts and all those basics, but we didn’t have the same processes they want now” (Supplier C).

“The biggest change has been around the social responsibility, because we’re documenting a lot more stuff, and we’ve got some systems in place around training matrices, and that probably helps with staff development” (Supplier D).

“...the social responsibility pillar, we probably had to do a bit of work on that. Yeah, because the things like the training matrix and the performance and learning agreement, I mean they’re quite specific to the programme” (Supplier J).

“Yeah, I mean it’s around managing the staff information. That’s a big one. That’s probably the area that’s changed the most and it’s around sort of a system of maintenance checks and timings and things” (Supplier I).

4.1.2.4 Observability

Observability in the context of its influence upon supplier attitudes toward LWP and its adoption, is related to a supplier’s ability to see the programme in practice within another farming enterprise. It also included the exposure and interaction with participants or elements of the programme.

LWP on Another Farm

Seeing LWP in practice on other farms shaped suppliers’ attitude towards the programme. Being able to observe the benefits from implementing the programme and talk to those who had undergone certification was valuable for getting a first-hand account of the effort required and the associated advantages and disadvantages:

"Yeah, because we'd already seen it work on existing farms with Synlait and I think that was important" (Supplier B).

"...they talk about their experience – you've got to be straight. I mean they talk about the problems they've had as well. As with all things in life, if it was all rosy all the time everyone would be doing it" (Supplier F).

"We could see from the work that they were doing, in terms of gathering all the evidence and that, I remember going, 'Shit, if that makes the team become more aware of their weaknesses or other areas, then it's got to be pretty good'" (Supplier G).

Those who did not have the opportunity to visit another farm prior to adoption all recommended that this would be a good idea:

"I would imagine it may be easiest for a farmer who is interested in it to go to a farm which is doing it and see some of the stuff that they're doing, and have a look through some of their records of what they're keeping" (Supplier E).

Suppliers also found that observing an audit was extremely beneficial as it helped them to understand the processes involved and the magnitude of effort required. For many it gave them a realistic account of the requirements of an audit, whilst also providing reassurance that it was achievable:

"So what I did was I went and saw another audit getting done, because just straight away you're like, 'this isn't as hard as what I thought it was going to be,' and then you can relax into yours and stuff" (Supplier G).

Two informants suggested the introduction of a buddy system where newly LWP signed suppliers were matched up with a certified supplier in their area to help mentor them and help provide resolutions to any issues they may experience:

“As soon as someone in your area is starting with the programme they should mentor them up with someone that’s done it. A buddy programme sort of a system” (Supplier C).

LWP Focus Day

Almost two thirds of informants interviewed commented that they found the LWP focus days to be valuable because they gave the opportunity to discuss and understand the experiences of other suppliers. It gave them an opportunity to observe some of the practices and systems that LWP offers, be immersed in the culture that LWP facilitates, as well as witness some of the opportunities it can bring to farms:

“It gives you a chance to ask questions to a farmer about how it was going to – what was required” (Supplier D).

“Yeah, it had some interesting stuff in there actually, because I was just starting off. Yeah, I found it quite interesting. It sort of wetted my appetite, got me definitely fired up about a couple of things so it was quite good. But my knowledge base then was pretty low, to be fair, but yeah, I found it definitely interesting” (Supplier H).

Even those who attended focus days after certification still found them valuable to share ideas and discover new concepts that could be applied within their own farm:

“We went to one last year on the banks of the Selwyn and yeah, it’s good to rub shoulders. Sometimes you can’t always get there but it’s always good to just see what other people are doing” (Supplier F).

“...again, it’s just the sharing of ideas and the hard part is some of the ideas that we see on other places are capital purchases, so to try and get them across the line is a lot harder. But I suppose it just gives us ideas. We try and take our team along to those things as much as we can, so they can see if there’s areas that we think that we could be doing better in, or just to give them better ideas and change up what we’re doing. Yeah. Just try and pull at least one idea out of those days” (Supplier A).

4.1.2.5 Trialability

Trialability related to the supplier's ability to experience LWP without having to fully commit to the programme. Suppliers noted that this is not really an option with LWP but discussed ideas that may allow for some exposure to the programme without committing to the certification process. Suppliers were against allowing the programme to be trialled by those considering adoption because it comprises the firm commitment required. They felt it was not a programme that could be just attempted, and this would not align with the level of engagement required of a certified supplier.

Trial Audits

Just under half of the informants recommended that an option to trial an audit to see what was involved may be helpful. Non-adopters noted that it would allow them to understand where their farm currently sat in terms of meeting the requirements and allow them to comprehend the amount of work that would be required to become certified. Certified suppliers noted that they were provided with an internal audit by Synlait prior to their external audit with AsureQuality. They identified that this was valuable and suggested that a similar process prior to adopting and committing to the programme would be helpful:

“Being able to trial an audit, yeah it would be great. Then people would be a lot more realistic and it would allow you to know what to focus on” (Supplier A).

Adoption of Single Pillars

One third of informants felt allowing the programme to be more flexible in its adoption and that trialling the program through the adoption of one pillar at a time would perhaps be a helpful means of making the programme more attractive. Non-adopters identified this as a means by which they would be more willing to consider adoption:

“It’d be good to just be able to give it a crack – try a wee bit and see if it’s for us. Just one pillar or something. Think we’d think about it a bit more then” (Supplier M).

“I don’t know, there are a few people I’ve spoken to and the reason they can’t do it is for environmental reasons, or something, if there’s a huge capital expense they’ve got to go through to get there. But if they could be accredited in the other areas and just get paid for those with the two cents structure. But put timeframes in place – they need to be working toward full certification” (Supplier A).

In contrast, some certified suppliers noted that the programme represents a commitment and that fellow suppliers ought to be prepared to do the entire programme or not participate at all:

“No, you can’t be half pregnant. I think that’s part of the process, it needs to be at a good level otherwise, as you said before, everyone would do it and it loses its value. If you’re committed to it, then it has more value” (Supplier F).

“You’re either committed or you’re not, and I think to be fair in the first instance there’s not a massive capital requirement for most people if they’re doing it well” (Supplier J).

4.1.2.6 Risk

Risk related to suppliers’ perceived risk of participation in LWP. This focused on both their individual reputational risk and business risk as part of participating in the programme.

Standard of Performance

Suppliers were concerned about the consistency of performance across those accredited suppliers and the risk this presented to their accreditation. They were worried that their performance may be compromised by those performing to a lower standard:

“There’s some people that do over and above, and there’s some people that meet the bottom line. You’re always going to have that but it’s making sure that the bottom line’s not jeopardising the guys above” (Supplier D).

“I think because of where the pass marks are they probably shoot themselves in the foot a wee bit because all Lead with Pride farms are not level or equal. To me they should be farms that no matter what day, you know that 95 percent, well quite not no matter what day, but 95 or 99 percent of the time you drive onto that farm you’re not going to worry about what’s there. They’re holding that standard all the time, not just at the time of the audit. They could take any of their customers on to those farms and know there’s no issue there” (Supplier G).

Almost half of the programme adopters suggested that the overall required level of performance to pass audits should be increased to help protect the quality and credibility of the programme:

“The pass marks are, in any category it’s what 70 out of 100 points. Like in my opinion it should be an A, you should be getting 90 or better in those categories, or at least 85 percent or better. I think 70 is quite low in terms of these should be the top – the best of the best” (Supplier A).

“There should be a rule, like you can’t go to gold elite until you are continually having a certain pass mark or something” (Supplier G).

LWP as Standard Supply Conditions

Suppliers were not too concerned with the concept of the LWP programme becoming a condition of supply. Nearly three quarters of adopters thought that it would strengthen the programme, however some raised concerns that this would lower the standard and lead to issues identified above around standards of performance:

“I don’t have a problem with that. But what will actually happen is they’ll start dumbing it down. They’ll water it down because the reality is – I can see where they’re going, because they need a critical amount of milk to get to market this thing and wouldn’t it be fantastic, I reckon it would be brilliant if they got every supplier over the line. Fantastic, 100% behind it. But you keep the standards up” (Supplier B).

“There’s strength in numbers. That’s the reason why we wanted to do the programme so that everybody could be a part of it and just increase the standard of farming in New Zealand” (Supplier C).

“You all get tarnished with the same brush, or the company does I suppose, and if one person’s the bad egg it ruins it for everyone, and so that’s what’s happening with Fonterra at the moment, it only takes one supplier. So yeah, I think that’s what the standard needs to be to of a Synlait supplier” (Supplier H).

However, all of the non-adopter informants identified that this may cause some issues and concerns relating to the loss of supply:

“I’d hate to see them drop non-Lead with Pride farms to take on a new supplier that’s willing to go with Lead with Pride, because that’s not what the programme’s all about. So I’d hate to think existing suppliers would lose out, lose supply because they’re replaced by – and just because they don’t want to upgrade their effluent pond yet or whatever” (Supplier I).

“I mean it could be a really strategic move and might make a lot of sense, as long as they were confident of getting enough supply, because I’d imagine some farmers would put in their cease” (Supplier A).

Public Exposure

Over half of the adopters were concerned that exposure of the programme to the public would create some risk, as it would potentially expose individual farms and there was worry that practices may be misconceived or taken out of context, particularly when there may be a slight lapse in performance as farms recognised performing 100% all the time was not realistic:

“I also do find sometimes maybe you’re a tall poppy as well, and so if you have a mistake happen you might find that you’re made an example of more” (Supplier C).

“I think if the program ever came into negative, like I don’t see why it would, yeah that’d be a risk for us. It’s got to be delivering on what it’s saying, I suppose, which is leading best practice, so if it’s not doing that then there’s no point to have the programme” (Supplier H).

Suppliers noted that the current exposure of LWP to the public was probably appropriate given its scale and that Synlait would have to be cautious in the development of future marketing:

“I think it’s probably not a bad balance at the moment. You start pushing these things too hard and then you’re up on a higher pedestal, you’ve got a long way to fall. So I think it’s grown nicely and I think it will keep going forward” (Supplier D).

“They’ve got to be confident that the system’s running well, because the worst thing you could do is go, ‘Come over here, have a look at this,’ and there’s a fail. It’s a full-on system, there’s a fair bit to it” (Supplier I).

Failing Audits

Suppliers identified failing audits as a significant risk associated with programme participation. They were concerned with the exposure of their failures and the impact this would have on their reputation:

“I’d be gutted though if we lost our accreditation, that’s my biggest risk. If we lost that because we did something stupid that was preventable, or something went wrong, or on the audit day we got something badly wrong. Then the people taking our milk, paying us for our milk, see we’ve done wrong” (Supplier B).

One supplier noted that LWP in its own right was a form of risk reduction through its required processes and procedures:

“I would have thought the benefits would outweigh the risks by far because it’s for the advancement of the farmer, the programme. It’s actually reducing the risk” (Supplier I).

4.2.3 LWP as Perceived Norm

LWP as a perceived norm refers to whether adoption of a programme such as LWP is considered to be common practice amongst farmers. This is related to its observability and extended to include LWP being considered as normal amongst the wider public and the exposure that helped create this. Suppliers also expressed their desire for LWP to be further perceived as a prominent means for achieving best practice within the dairy industry.

4.2.3.1 Observability

Observability in the context of LWP as a perceived norm related to the ability for LWP to be observed and more importantly understood by the public. Furthermore, it addressed LWP being considered as a realistic and beneficial program by the wider supplier base.

Gate Signs

A few informants said they saw LWP Gate signs (Figure 8) at the entrance to a supplier's tanker tracks and that this generated an interest in the programme:

"I hadn't actually seen LWP on another farm physically, only on somebody's gate going past. Yeah. You see the sign on the gate and go, "I wonder what that's about?"
(Supplier B).



Figure 8 A LWP Gate Sign, below the standard supplier's gate sign at the entrance to a supplier tanker track.

Suppliers also commented on the ability for these signs to be a physical representation of a supplier's participation and the fact that these were observable by the public. Some identified that the signs helped with enforcing accountability as anyone had the ability to identify the farm as LWP and also helped generate interest in the programme:

"We're in an area that's predominantly arable. I thought, if we can get something up on the gate there that shows we're sort of going that next level, it doesn't do any harm at all" (Supplier D).

"I was down to Ruapuna the other day and there was a farm there that I didn't know that was involved in it, saw the Synlait sign, and there's a little black sign underneath. I thought, 'That's good'" (Supplier I).

"I mean I know our neighbours, a cropping farm, he had no idea, he said, "What's that bloody thing doing up your gate?" So he asked the question, and so we said, "It's a QA programme," and because I've been involved in that industry before I knew I could relate it to what he's doing. He was good with it. In fact he brought customers last year and he came, and he was quite interested about the whole thing" (Supplier B).

Market Product

Suppliers expressed their desire to see the LWP programme utilised to develop a marketable product that could be sold for a premium within markets. Many suppliers understood that there was consumer demand for products that could demonstrate characteristics of ethical production practices.

Two thirds of adopters said they felt this would give them a sense of purpose as their hard work was being utilised and additional value was being extracted for the efforts they put in behind the farm gate. They wished for people to understand what was required of LWP and believed a product sold at a premium price would help with this:

"I'd like to think there was a market for it but that's really out of our control. I think there should be a product made from it, just to know that your milk is being used for its

true value – everything has been followed through and the right procedures, and no shortcuts have been taken. If it was marketed better, as a milk from Synlait, as a New Zealand product, I think there would be a demand. Because of the anti-feeling towards dairying and all the things going wrong. I think people would look at that as a positive. But yeah, you’ve just got to find the market and break into it” (Supplier B).

“It would be nice to see a market attached to it, especially for that Gold Elite, and a bit more of a focus on the premium and the fact that it is a bit of a specialty milk when you get to that level” (Supplier I).

Suppliers understood that LWP would be difficult to market, however if this could be achieved they would expect some reflection of the value being extracted, to be returned to them in the form of higher premiums:

“There are so many different dynamics of the Lead With Pride programme, like the Grass Fed’s an easy explanation, ‘This is what we feed, this is why it’s better,’ sort of thing. Whereas Lead With Pride’s like, ‘we do this, this, this,’ but then it almost complicates exactly what they’re sort of trying to sell” (Supplier E).

Public Perception

Despite the desire of some suppliers to restrict exposure of the programme, other suppliers were concerned with public perceptions of dairying and wished for greater exposure of the programme. This would enable them to demonstrate some of the effort that was being made to improve practices within the industry. Having the public better understand the programme would assist in it being considered to be an effective way of farming within BMPs. Under the current status, suppliers do not consider the programme as the perceived norm due to the fact it is not understood by those outside the Synlait supply group:

“A lot of it when we looked at it was, well we do these things anyway, so why not show people that we do it in a way that they’ll understand. So yeah, like we said before, it’s a way to market ourselves and market the farm, and the industry, show people on the outside that there are people doing good” (Supplier G).

“...the whole point of this is that you say, ‘This is what we’re doing,’ and I don’t know what the plan is as to when they’ll start showing that is or how that might change at some point, but it would be pointless to keep it under the radar forever. It just needs to be pushed, no one knows what LWP is yet” (Supplier I).

“I think that it’s getting better, but just it’s one of those positive stories, it’s good to get out there as opposed to all the sort of negative stuff. We need people to know what we’re doing, see it for what it is and then maybe LWP will be considered the way of doing it – the how to of farming to good practice. Heck, maybe the government should buy the programme.” (Supplier D).

4.2.4 Perceived Behavioural Control over LWP

Perceived behavioral control comprised both an individual’s control over the adoption decision and their perceived control over the operation of the programme once adopted. Each farmer had control over the decision to adopt LWP because it is a totally voluntary programme. This reduced the effect perceived behavioral control had over the decision to adopt as it was a predetermined variable. Many of the farms participating in LWP were encouraged to do so as they didn’t feel under pressure to meet the requirements in a given timeframe and could work at implementation at a chosen rate. Of more significance was the perceived control over the programme’s operation and the extent to which they could adopt their own means of meeting programme requirements.

4.2.4.1 Complexity

The prescriptive nature of the programme means that there is not much opportunity for suppliers to control and make changes to the programme to make it less complex.

Standards Committee

As part of the requirement for the programme to be ISO certified, Synlait must hold a minimum of one standards committee meeting which includes input from certified suppliers. Those interviewed who had the opportunity to attend a standards’ group meeting as a

farmer representative, liked the control it gave them to consider newly introduced or proposed alterations to the programme's standards. Similarly, those who attended favoured the farmers having an influence on the programme at the governing level, beyond discussions with the Milk Supply team:

"The other thing I do like is the fact they are quite flexible about some of the stuff they're implementing. They actually do consult you. Because we've pushed back pretty hard and in a couple of areas we said, "No way is that going to happen," and we've sat round the table at the standards meeting and they've gone, 'Well, shit okay, that's not going to work and is that best practice, and is that where we want to head?'" (Supplier B).

"I'd be concerned if the programme doesn't keep up with what's actually going on, on farm, which shouldn't happen because they have farmers on that focus group or whatever it is that catches up. Standards group I think it's called. That's good, it gives us a say at the top level and not something that can just be heard and not actioned" (Supplier G).

4.2.4.2 Trialability

Trialability in the context of perceived behavioral control related to suppliers' ability to have control over trialing LWP which was largely characterised by the influence of time factors associated with the programme.

Time Requirements

Suppliers felt they had control over the time it took them to become accredited which for some gave them the ability to feel they had the option to trial the programme and then exit, if they felt it was not for them. However, the prominent factor that was popular among suppliers was that they had full control over how long it took, meaning they did not feel pressured to complete the programme and compromise their day to day farming operations:

"There's no pressure to do it. Synlait help push you along but if you want to take your time and chip away at it, they seem pretty happy with that" (Supplier H).

“You can take as long as you want really to get it into action. If you decide to start and never finish, that’s fine too. You can have a taste of it, leave it, and come back to it another day, it really up to each individual” (Supplier A).

Suppliers also noted the ability to complete the programme at their own will and fit this around their farming season and the associated fluctuations of work load that come with the seasonality of dairy farming:

“You wouldn’t want to do it at your busiest time of year with calving, so the programme lets you do it when you want” (Supplier I).

4.2.4.3 Compatibility

Compatibility, in the context of influencing perceived behavioral control, looked at how the supplier’s perception of their ability to adjust and influence the programme to better suit their farming operations influenced their decision to adopt. This particularly focused on the ability to alter the methods for applying LWP to each individual’s farm. This factor largely considered control beyond adoption, assessing compatibility in the context of integrating the programme into the farm operation.

Alter Programme Systems

Suppliers favoured the flexibility within the programme that allowed them to implement their own systems and procedures for meeting programme requirements. Whilst the programme has recommended means for meeting requirements, including templates and records books, it is at each supplier’s discretion as to how they implement these. For many suppliers they used a mixture of both Synlait’s methods and their own which they recognised as being effective, as it meant they could continue using existing systems or implement suggestions where there was not currently a system:

“We’ve actually had to blaze our own trail with a lot of the records and I’ve got stuff in the office which is in my own books and stuff, its user-friendly stuff, but a lot of the

staff will understand. It ticks the box but it's in a format that suits our farm." (Supplier B).

Voluntary Participation

Suppliers appreciated having the ability to choose whether they implemented LWP on their farm. The voluntary nature of the programme gave suppliers a sense of control, which for many made them have a more positive attitude as participation was entirely at their discretion:

"It's a voluntary system. I mean if you want to do this, do it and get some more value. If you don't want to do it, don't do it. That makes sense" (Supplier H).

"The fact it's voluntary means a lot. I don't have to do it, I'm making a choice and there's guys out there that don't want to do it and that's fine, they don't have to. I can pull out at any time too. It's really up to each person" (Supplier J).

4.1.5 Factors Affecting Programme Adoption Summary

This section has discussed the characteristics that define adoption behaviours of the study's informants. The interviews revealed several programme features that hold significant weighting in influencing Rogers' (2003) attributes of innovation. It is these attributes which shape the behaviours of adopters. The quotes of informants provided strong support which was often extremely direct, showing the importance of certain areas. These are discussed throughout chapter 6.

4.2 Financial Implications of Adoption

As identified in section 4, informants' interviews revealed that relative advantage had a significant influence upon the adoption of LWP. The following section provides results from an analysis of financial implications of the relative advantages and disadvantages associated with programme requirements.

4.2.1 Environment

The results from assessing financial implications of the environment pillar are discussed below and summarized in tables 4 & 5.

Electricity savings were the only financial benefit within the environmental pillar. Financial case study farms noted that they thought electricity savings were also related to other LWP requirements such as more efficient application of irrigation and the ability to apply effluent at night when power rates were cheaper due to the installation of a failsafe device which meant the effluent applicator did not have to be watched under daylight. This is supported within the literature which outlines that regular maintenance and increased irrigation efficiency has been proven to reduce pumping costs (Thomas, Bloomer, Martin, & Horrocks, 2006). One farm's irrigation electricity savings were excluded due to the significant reduction in electricity costs associated with pumping as a result of switching to the Central Plains water scheme.

Reoccurring costs of an effluent WOF and planting impacted the financial implication of the environment pillar. Effluent WOF costs vary, dependent upon the charge out rate of the auditor carrying these out, however the standard cost is approximately \$1200 (Michael Edmondson, personal communication, December 17, 2017). As the Effluent WOF must be carried out every five years, the potential cost of this has been divided across five years. Planting presented only a minor cost for farms. Although the three financial case study farms noted they had generally planted more than the required 10m² (as 10m² was a very small area), only that required for certification was calculated. Dairy NZ outlined that the cost of planting ranged from \$1-\$7 per plant, \$1-\$3 for plant shelter and 25-30 cents for weed control in a 1m spot of planting which would require several applications (DairyNZ, 2017). For the purpose of this study the cost of \$3.50 per plant, \$2 per plant guard and weed control of 30 cents per 1m² application with 4 applications required per year was utilised.

Courses required presented some of the capital expenditure requirements of LWP certification. The cost for the Irrigation New Zealand course depends upon whether the

individual is a member of Irrigation New Zealand, with members paying \$350 to attend the course and non-members paying \$550. Financial case study farms varied as to whether they were a member and as a result an average of the two costs has been utilised for the purpose of this study. The effluent management training standard is a course offered by Primary ITO at a cost of \$575 (Primary ITO, 2018). This cost is incurred by those who did not already have staff who had passed this course. The remainder of the capital expenditure cost came from the effluent fail safe which presented a significant portion of total environmental pillar costs.

Table 4 Lead With Pride Environment Pillar Financial Implications Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
<i>Effluent WOF</i>	-\$240	-\$0.00	-\$0.00
<i>Planting</i>	-\$56.00	-\$0.00	-\$0.00
<i>Farm Power Usage</i>	\$1,638.30	\$0.01	\$0.01
Total	\$1,342.30	\$0.00	\$0.00

Table 5 Lead With Pride Environment Pillar Capital Expenditure Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
<i>Irrigation Operator and Manager Training Course</i>	-\$450.50	-\$0.00	-\$0.62
<i>Primary ITO Effluent Course</i>	-\$575	-\$0.00	-\$0.80
<i>Effluent Fail Safe Device</i>	-\$5,000	-\$0.02	-\$6.92
Total	-\$6,025.50	-\$0.02	-\$8.33

4.2.2 Milk Quality

The results from assessing financial implications of the milk quality pillar are discussed below and summarized in table 6 & 7. The main cost associated with certification was to achieve course requirement outcomes. Stage One Milk Quality costs \$280 (which two staff must have) while stage 2 costs \$290 (Primary ITO, 2018). This equates to a total cost of \$850 to meet this requirement. The cost of an approved handler's certificate differs across the various providers, however was typically around \$350. The average cost was spread across five years, to reflect the five-year renewal period of the certification. The main benefit within the Milk Quality pillar related to the incentive paid for being grade free, however the reduced financial grading penalties also provided some financial gain.

Table 6 Lead With Pride Milk Quality Pillar Financial Analysis Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
Reduced financial grading penalties	\$576.55	\$0.00	\$0.80
Approved Chemical Handlers Certification	-\$70	-\$0.00	-\$0.10
LWP Milk Quality Grade Free Premium Incentive	\$6,324.96	\$0.02	\$8.75
Total	\$6,831.51	\$0.02	\$9.45

Table 7 Lead With Pride Milk Quality Pillar Capital Expenditure Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
Milk Quality Primary ITO Courses	-\$850	-\$0.00	-\$1.18
Total	-\$850	-\$0.00	-\$1.18

4.2.3 Animal Health and Welfare

Animal Health and Welfare had the largest number of benefits and costs associated with certification and consequently resulted in the pillar with the largest financial implication. The results from assessing financial implications of the animal health and welfare pillar are discussed below and summarized in table 8.

Benefits relating to condition and weight of stock held large value, particularly when effects on production were considered. Data from financial case study farms showed that there was an improvement in young stock bodyweights relative to target weights at both pre-mating and pre-calving. These respondents attributed this to more frequent and proactive monitoring of livestock through the weighing requirements of the LWP. The case study farms had seen an average improvement of 20kg in young stock reaching optimal target weights at pre-mating and 15kg at pre-calving when comparing figures prior to LWP with those since being a part of the programme⁷. This improvement included both reduction in overweight and underweight stock (i.e. more young stock closer to target live-weights). An average of gains from pre-calving and pre-mating was then used to provide a gain in lactation one of \$38.59 per heifer and \$42.05 at lactation two. In the first year of LWP participation only the benefit derived from lactation one would be obtained, however in the years following both

⁷ Some farms' young stock had gained weight whilst others had lost weight to get closer to target live weights.

benefits from lactations one and two would be realised. For the purpose of this study both lactations are considered, providing an average potential annual gain of \$12,275.45 across all replacements in their two lactation periods.

A range of cost (to consider the 5kg of live weight gain required across the varying starting weights of the heifer) was calculated to be \$944.46 to \$1679.04 per replacement herd (ranging from gaining weight at 100kg or gaining weight at 450kg). The average of these two was utilised in the final financial analysis (\$1,458.56). Earlier monitoring of live weight would help reduce this cost by allowing weight to be maintained when the required inputs are lower. The young stock weighing requirements of LWP would be expected to ensure this weight was maintained at earlier stages and therefore the higher cost calculated at 450kg would not be expected to occur. Weighing youngstock equated to a potential annual cost of \$1612. As with the benefits derived from improved 6 week in calf rates and milk solids at first lactation for young stock, this cost would only be incurred if these practices were not occurring prior to adoption.

Other animal health indicators relating to mastitis and lameness also had significant impact upon financial implications of adoption. Averaged data from financial case study farms revealed a reduction in lameness cases of 39 cows on the average Synlait supply farm. This equated to a benefit of \$1,546.67 per annum. On average, farms had reduced their cases of clinical mastitis by 20. The DairyNZ SmartSamm calculator determined the potential cost saving from reduced clinical mastitis to be \$3300. Financial case study farm data found there to be an average reduction of eight cases of culling due to clinical mastitis and two fewer deaths. This reduction was entered into the DairyNZ SmartSamm calculator which provided a possible saving of \$21,600 utilising data from the informant farms. SCC had reduced from an average of 159 to 149 from pre-certification to post certification. A potential cost saving of \$3,900 was attributable to the reduction in SCC, achieved through increased milk production, whilst the incentive paid for SCC under 150,000 gave a benefit of \$6325.

Table 8 Lead With Pride Animal Health and Welfare Pillar Financial Implications Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
Gain in MS at first lactation	\$12,275.45	\$0.04	\$16.98
Gain in 6-week in Calf Rate of young stock	\$1,696.64	\$0.01	\$2.35
Cost reaching young stock target live weight	-\$1,458.56	-\$0.00	-\$2.02
Cost of weighing stock	-\$1,612.00	-\$0.01	-\$2.23
Reduced Lameness	\$1,546.67	\$0.00	\$2.14
Reduced Clinical Mastitis	\$3,300	\$0.01	\$4.56
Reduced Culling due to Mastitis	\$21,600	\$0.07	\$29.88
SCC Incentive	\$6,325	\$0.02	\$8.75
Reduced bulk milk SCC	\$3,900	\$0.01	\$5.39
Total	\$47,573.20	\$0.15	\$65.80

4.2.4 Social Responsibility

The results from assessing financial implications of the social responsibility pillar are discussed below and summarized in table 9. The single cost associated with the social responsibility pillar was a first aid course. Other associated benefits have been discussed in section 5.1.

Table 9 Lead With Pride Social Responsibility Pillar Financial Implications Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
First Aid Course	-\$179.20	-\$0.00	-\$0.25
Total	-\$179.20	-\$0.00	-\$0.25

4.2.5 Financial Evaluation Summary

Table 10 summaries the possible financial implications from adopting LWP, broken down by each pillar (excluding the capital costs). Capital cost calculated using the financial informant farms may range from \$0 to \$6875.50 dependent on the individual farm's situation prior to deciding to adopt LWP. All capital costs are a one-off occurrence associated with becoming accredited and therefore would be incurred in the first year of certification. Each subsequent

year of certification following would not have these costs included. The financial summary includes the two-cent payment which is paid for maintaining certification.

The results show that a possible average financial implication from adopting LWP is \$61,892 (Table 10). This advantage would vary significantly for individual farms dependent upon the degree to which the farm met requirements prior to adoption. Furthermore, results would vary depending on other farm characteristics such as farm and herd size. This result is merely an indication that an advantageous financial outcome from adoption of LWP can be achieved.

Table 10 Lead With Pride Financial Evaluation Summary

Benefit/Cost Item	\$/farm	\$/kgMS	\$/Cow
Certification Incentive	\$6,325.96	\$0.02	\$8.75
Environment	\$1,342.30	\$0.00	\$1.86
Milk Quality	\$6,831.51	\$0.02	\$9.45
Animal Health & Welfare	\$47,573.20	\$0.15	\$65.80
Social Responsibility	-\$179.20	-\$0.00	-\$0.25
Total	\$61,892.77	\$0.20	\$85.61

Chapter 5

Discussion, Recommendations and Future Research

The primary research objectives of this study were to obtain an understanding of motives driving adoption of LWP and quantify the financial value of becoming LWP Gold Plus certified. The previous chapter presented the results from the qualitative interviews and financial evaluation. In this chapter, those findings will be discussed. The significant findings associated with motivations are explored in relation to the literature presented in chapter 2, whilst the discussion surrounding the financial evaluation focuses on the areas that impacted profitability and contrasting this against existing findings within the literature.

Section 5.1.1 presents the major findings of this study. This is followed by a discussion of each of the findings and answers research questions one and two: “What are the motivations driving supplier willingness to adopt LWP?” and “Are there other associated effects in achieving LWP certification?” These findings are discussed in the context of the conceptual model presented in chapter 4. Section 5.1.2 discusses the finding of the financial evaluation broken down by each pillar.

5.1 Discussion of Significant Findings and Recommendations

5.1.1 Factors Affecting Programme Adoption

The analysis found there were several factors that influenced the three beliefs presented in the conceptual framework for LWP adoption (Figure 7). The influence of the three behavioural beliefs upon adoption and those key factors which comprised them are discussed below. These factors are also compared with the existing literature.

5.1.1.1 Behavioural Beliefs

Findings from this research determined that attitude was the overwhelming factor influencing adoption and willingness to continue LWP within suppliers farming systems. This is consistent with numerous studies which have indicated that the level of participation in voluntary stewardship programmes, programme acceptance and success is determined by

the attitudinal characteristics of individual farmers (Atari, Yiridoe, Smale, & Duinker, 2009; Hyland, Heanue, McKillop, & Micha, 2018). The dominant role of attitudinal factors in influencing adoption was highlighted in a study which reviewed 25 years of literature focusing on the adoption of agricultural BMPs, concluding that attitudes were the most frequently positively associated factor with adoption (Prokopy et al., 2008). In this research, results showed attitude factors significantly influenced suppliers' decisions surrounding adoption and general perceptions of LWP. This finding reaffirmed the findings of Wauters, Biielders, Poesen, Govers, and Mathijs (2010), who suggested that in order to affect farmers' intentions to adopt and the adoption rate itself, farmer attitudes towards this practice should be improved.

Relative Advantage

Similarly to Reimer et al. (2012), relative advantage was important for motivation of adoption or continued participation and was the most influential factor in shaping a supplier's attitude. Relative advantage encompasses factors of economic, social and environmental factors in determining the decision to adopt (Pannell et al., 2006). In this research, this was prevalent with identification of influential factors across each of these categories such as financial incentives, staff engagement and improved productivity in given individual practices. Relative advantage was also a major factor preventing adoption amongst non-adopter informants, with them perceiving there to be not enough advantage in adopting. The overwhelming dominant influence of relative advantage upon a supplier's decision to adopt and perceptions of LWP is in part due to the fact that relative advantage is affected by other characteristics of Rogers (2003) innovation theory. Pannell et al. (2006) explains that complexity can reduce a given innovation's relative advantage through increasing the intensity of the effort required and making it less desirable.

It is important to note however, that individuals vary in their perception of a given practice's relative advantage due to the fact these are influenced by background characteristics. The results showed that background characteristics such as farm size significantly influence perceived relative advantage, as larger farms could achieve economies of scale through the implementation of some practices, therefore making the relative advantage greater than that of a smaller farm. This was particularly the case with non-adopters, where farm scale

prevented them from achieving the economies of scale required to implement capital intensive requirements. Those factors which contributed to relative advantage were experienced by a number of participants, however they may not apply to each individual.

Premiums were a key driver of a farmer's perceived relative advantage. Financial incentives help encourage the adoption of an innovation when finances are of particular concern to potential adopters and impact significantly upon relative advantage (Veil, 2010). Premiums were predominantly recognised as a means of compensating for effort rather than a compensation of financial costs associated with programme implementation, meaning premium incentives must adequately offset some of the disadvantages associated with LWP. Schroeder, Chaplin, and Isselstein (2015) note that payments made for scheme participation need to consider those outcomes which are perceived by participants as negative and have a subsequent negative impact on the acceptance of the scheme. The importance of a premium for driving adoption is consistent with the literature which recognises that voluntary adoption of BMPs will only occur if the required practices can be economically appealing (Feather & Amacher, 1994). Other relative advantages identified throughout the interviews also help offset the negative impacts of LWP which suggests that the incentive payment is only one aspect compensating for required effort. However, of notable importance was the benchmarking of LWP incentive payments against other special milk premiums offered by Synlait and the comparative efforts required. This is a relatively unique scenario, where farms are being paid premiums both for production practices which are associated directly with a product (such as a2 Milk™) and that which is simply rewarding 'doing good'. Fearne and Walters (2004) report that for a price premium to be delivered, a given scheme requires attributes that are valued by consumers and the effective communication of credence attributes. Currently, LWP does not have an attached marketable product, meaning that if a market was obtained and market premiums were being returned for the best practices applied on farm, these should be reflected in the premium paid for programme participation. This aligns with a supplier's expectation that premiums would be increased once a marketable product could be developed and released to market.

Other notable relative advantages included the programme's reactivity to industry changes and the ability to ensure compliance with regulations. Previous research has found perceived benefits in simplifying compliance processes for farmers, by providing them with a single administering agency and reducing associated transactional costs through integration that provides economies of scale (Falconer, 2000). Similarly, suppliers recognised this opportunity, acknowledging LWP facilitated a simple process for combining compliance requirements, which in addition provided suppliers with reassurance surrounding compliance and reduced compliance monitoring frequency. The high costs faced by farming enterprises in meeting compliance is a well-known factor within the dairy industry and was highlighted as a concern within a survey of Waikato dairy farmers (Macdonald, 2014). This suggests an opportunity to promote the positive role farm assurance programmes play in facilitating the reduction of compliance costs and furthermore reduce the burden associated with farm compliance.

The case study interviews revealed that LWP provided an advantage in its ability to demonstrate accountability to both the public and farm owners (in the context of sharemilkers, contract milkers and farm managers). The ability for farm assurance schemes to demonstrate accountability of farming practices to the public and the desires of farmers to have practices positively perceived by the public, is not a new phenomenon (Lewis et al., 2008; McGlone, 2001; Verbeke, 2009). However, the role of farm assurance schemes in facilitating accountability between sharemilker, contract milkers and farm managers and their farm owners has not been widely explored. This is possibly because most assurance schemes relate to production practices that influence the final consumer product and not necessarily those that focus on components of farm management. This is evident through a shift from producer led schemes to those which adopt a true market orientation focusing on marketable attributes of consumer products (McEachern & Warnaby, 2005). The results from this study suggest that whole farm approaches to farm assurance schemes, such as that of LWP, can demonstrate accountability to the public that fulfils their demands for best practice production. The programme also provides a framework for effective farm management that can be utilised to demonstrate performance to farm owners that are absent from day to day management processes. Therefore, pitching LWP to farm owners as

a means to provide a framework allowing independently assessed assurance of farm performance may be an alternative means for driving programme adoption.

Disadvantages associated with programme adoption negatively impact upon the relative advantage and are likely to reduce programme adoption (Rogers, 2003). Suppliers revealed that the time and workload, record keeping and pillar duplication were amongst the key disadvantages associated with LWP. Leviston, Price, and Bates (2011) had similar findings and termed this “overregulation”, deeming it to be a significant barrier to adopting farm practices. Time and workload pressures were largely recognised as being offset by compensation through incentive premiums and other programme associated advantages. Issues surrounding record keeping within a farming context are not uncommon and farm managers have found keeping and analysing farm records a challenge for some time (Pena et al., 2002 as cited in Abubakar & Ahmad, 2017). There are a number of solutions that can assist in ensuring that information management becomes easier, timelier, and generally provide greater value such as the adoption of computerised information systems (Alvarez & Nuthall, 2006). Electronic capture of data would allow for more flexible record keeping and provide for data aggregation which could be utilised to support farm decision making. The adoption of electronic means of record keeping facilitates a more simple process, allowing for a farm to keep a larger number of records and perform more extensive and complex analysis of inputs (Lewis, 1998). Record keeping is useful and can provide more insight into the farming operation and allow for improvements in farm efficiency and profitability (Grisham & Gillespie, 2007).

Whilst the findings identified a number of advantages associated with certification, it is the carefully planned communication of these that can help to reinforce attitudes which support adoption and counteract those which act as barriers (Garforth et al., 2004). This is a factor which must be considered by Synlait if it is to promote the uptake of LWP amongst its suppliers and points to an important consideration for the industry in adopting schemes which facilitate BMP amongst farmers. Garforth et al. (2004, p. 25) builds upon this factor of communication to note that the strong weight of attitude in influencing adoption decisions suggests that any promotion surrounding adoption ought to “focus on reinforcing those beliefs that are identified as drivers and combating those which are barriers”. The same must

be said for LWP, in which the prominent advantages must be utilised to promote farmer adoption whilst the consistently alluded to disadvantages are mitigated in the programme's development.

Compatibility

Incompatibility was the primary barrier to adoption cited by the non-certified suppliers, with them noting that their systems did not meet many of the existing requirements and consequentially a substantial amount of work was required to meet certification. This is consistent with Reimer et al. (2012) who found incompatibility to be one of two primary barriers to adoption. Incompatibility had a strong relationship with farm characteristics, in particular farm infrastructure, which often required significant capital investment to bring these infrastructural components (primarily effluent systems) up to the required standards. However, many certified suppliers noted that their farm already met a number of the requirements and this assisted with making the certification process easier and more attractive.

The social responsibility pillar of LWP required the most change in practices on farm. This is hardly surprising, given the production focused nature of the dairy industry, in which the social aspects of farming have largely been overlooked, whilst environmental and animal welfare issues have been under the spotlight (Clark, Caradus, Monaghan, Sharp, & Thorrold, 2007). Interventions that prompt the facilitation of learning in regard to people management on farm have been found to be a catalyst for driving improvement in this area and represent a significant positive step for change at the individual farm level (Nettle, Paine, & Petheram, 2006). Stup, Hyde, and Holden (2006) suggest that the growth in the size of farming operations through expansion has led to an increase in the number of employees which has prompted the need for major changes in the responsibilities of dairy managers. The requirements of LWP impose more structured practices that farm owners and managers use to administer their social practices on farm. The transition to this form of management appears to be a challenging and unfamiliar task for managers and was a deterrent for non-certified farms. That this is not uncommon amongst farming businesses and was paralleled in the literature, with Stup et al. (2006) noting that dairy farms struggle with the transition to more structured human resource management. This suggests that as an industry focus on

the people management aspects of the farming enterprise is required, to assist in driving farm profitability and ensuring the attraction and retention of highly skilled staff. As this area of the programme seems to be largely incompatible with existing systems and consequently causes implementation difficulties for farmers, additional support may be required in assisting farms to achieve certification and ensure best social responsibility practices on farm.

Observability

The ability to observe LWP in practice had a positive influence upon adoption amongst suppliers. Notably, a number of case study farms which were not a part of LWP had not had the opportunity to observe a LWP accredited property. Reimer et al. (2012) describes this as practice observability (being able to see the actual practice in place) and notes that when advantages are observable BMPs are more likely to be adopted. Guerin and Guerin (1994) note that some innovations do not lend themselves to the characteristic of observability as they cannot be easily communicated due to their complex nature. This is particularly the case with LWP where many of these requirements are credence qualities, meaning they are not physically observable. This highlights the importance that discussion with a LWP accredited supplier has in facilitating observability of LWP. Prokopy et al. (2008) discuss the importance of building such social capital in the form of multiple opportunities for farmers to interact with others. This suggests the need for facilitation by Synlait in providing opportunities for suppliers considering adoption, to network with accredited suppliers. Heterophilous and homophilous networks can be facilitated through field days and other educational opportunities and may help to increase adoption rates (Prokopy et al., 2008).

Trialability

Trialability seemed to have little effect on a supplier's decision to adopt. One explanation for this could relate to a point raised by Pannell et al. (2006) that trialability is determined by characteristics of the innovation itself. This suggests that trialability is relative to the given adoption being considered, meaning that there is variation amongst innovations that lend themselves to being trialled. LWP is characterised by factors which require reasonable time inputs (such as time to gather records over a given period and time required to construct SOPs) that do not permit it to being partially adopted in a trial sense. It is hardly surprising then that the extent to which LWP could be trialled on a small scale before full adoption was

largely not associated with the rate of adoption. Rather the ability to observe it having been successfully implemented on another farm was enough reassurance that full adoption was a viable option for the individual supplier. A small number of farmers suggested that the ability to adopt a single pillar at a time, effectively trialling the programme may help with adoption. Conversely, some farmers expressed that this would be a risk to the programme as it compromised the commitment required for certification. This identifies that trialability is a key aspect when influencing the perceived risk of a new adoption. Trialling the programme would a benefit to those farms where compatibility presented large issues. It would allow them to trial individual pillars which were largely compatible with their farming system to understand the programme requirements and provide an indication of the extent of the work involved. This may help to increase adoption as farms can assess the feasibility of the programme without full commitment. Managing risk associated with commitment would be required to ensure farms still adequately met standards and that these farms continued working towards full certification within a given period.

Complexity

Computer skills and ability largely related to personal characteristics consistent with those of the literature in which education, business size and age have been identified as influencing computer literacy amongst farmers (Alvarez & Nuthall, 2006). Predominately older suppliers, those who had not had any tertiary education and those who were smaller independently owned farms lacked the required computer literacy to complete requirements of the programme. Alvarez and Nuthall (2006) suggest that providing extension services to farmers which aid in developing their computer skills, helps to improve the uptake of these technologies. Assisting those farmers who face this complexity will assist with adoption of LWP. It would be expected that computer literacy will reduce as an adoption barrier, as computer adoption increases through more exposure (particularly through off farm employment), increased use and diminishing operator age as a younger generation replaces retiring farmers (Batte, 2005). This is an important factor to consider for suppliers who do not have the required skills within their team or household and therefore support of this ought to be targeted.

The assistance from the milk supply team provides farms with access to information and support required to complete the programme. Such forms of extension have been identified within the literature as helping to increase adoption by building farmers' capacity and reducing uncertainty about the likely outcomes of a new technology (Abebe, Bijman, Pascucci, & Omta, 2013; Greiner et al., 2009). All suppliers recognised this help as pivotal in the certification process and noted that it reduced the complexity. It also provided assurance that they were completing programme requirements to the correct standard, reducing the risk of not meeting certification requirements. Such support is required in adoption processes particularly with a programme such as LWP where changes to the current operating system are often comprehensive (Greiner et al., 2009). The assistance of the Milk Supply Team was also credited with reducing the complexity associated with technical aspects of the programme requirements, particularly with regards to social responsibility and newly introduced environmental requirements. These findings would suggest that the support service provided by Synlait should be retained, to ensure continued adoption by suppliers through easing the associated complexities.

Risk

Risk appeared to be the overarching concern of farmers, influencing their adoption decisions. Whilst aspects such as relative advantage and compatibility influenced suppliers' decision to adopt, these factors were assessed based upon their perceived risk to the farming enterprise and whether risk reduced following adoption. Cary, Webb, and Barr (2001) note a similar occurrence in which the perceived relative advantage for many farmers is strongly moderated by minimisation of risk. Premium payments are a perceived relative advantage amongst suppliers, however they also act as a risk minimisation strategy providing a means for risk aversion amongst adopters (Greiner et al., 2009). The offsetting of the risk in participating in the programme by paying a premium helped to cover any risk exposure for farmers. This ability to avert risk helped to increase adoption as suppliers have more confidence within their business.

Greiner et al. (2009) identify that BMPs can actually be seen to increase the risk exposure of the farming business and this concern was evident amongst the suppliers interviewed. Many of them noted that participation in the programme and implementation of the requirements

exposed them to higher public scrutiny and reputational risk due to the increased detail of auditing which could expose potential weaknesses in the farming operation. This is further reinforced in Reimer et al. (2012) where risk was the most important characteristic limiting adoption of BMP amongst agricultural producers. Yiridoe (2000) highlights the risk associated with increasing the profile of farming enterprises and disclosing information to the public, identifying that this can impede the improvement of perceptions of farming and lifting the profile of environmental farm initiatives. Despite this the implementation of BMPs has been identified as a risk management strategy in its own right (Greiner et al., 2009). When prompted with the concept of imposed risk through programme adoption, a number of suppliers credited LWP as being a risk reduction measure, in that it ensured they were compliant and prepared. A study looking at the process of developing and validating a BMP farm model developed for dairy farms in North Florida found that farmers saw advantage in decreasing the potential risk of fines for breaching regulations (Cabrera, Breuer, & Hildebrand, 2008). Regardless of whether perceived risk has a positive or negative impact upon adoption, the findings from this study resonate with those in the literature, that risk has a prominent influence upon adoption of BMP in a farmer context.

When contemplating the risk factors of LWP adoption, suppliers also considered potential future implications such as the potential for the programme's performance standard to decrease through increased uptake amongst suppliers. This is well summarised by Baumgart-Getz et al. (2012) who described the adoption of farm innovations as an investment which has unknown returns and a number of uncertainties. Farmers are required to think about both the present and future when considering the return from adoption of new innovations and ensure they account for delayed implications (Marra, Pannell, & Abadi Ghadim, 2003). This highlights a factor which is largely over looked in the adoption framework of Reimer et al. (2012) (Figure 2).

Risk factors relating to public exposure and standard of programme performance must be monitored to ensure these do not present a further barrier to adoption. Standard of performance can be improved through increased auditing scrutiny and more transparent record keeping, thus ensuring standards are being maintained in periods between audits.

5.1.1.2 Normative Belief

Suppliers expressed a common desire to have LWP recognised through means of a marketable product. A marketable product would allow for their production practices to be communicated and to provide assurance that their innovative production practices are being utilised to achieve market premiums. Suppliers recognised that this may create opportunities for market premiums to be returned to the farmer to help increase profitability. This is common amongst farmer producers globally, who seek financial reward for implementing best practice management principles within their farming enterprise (Greiner et al., 2009).

However much of the literature focuses on the desires of farmers to be better connected to their consumers rather than on farmers desires for directly attributable products within the marketplace. A study which examined the role of certification programmes in alternative agri-food networks found that farmers were interested in the development of strategies for constructing an alternative supply chain, which recognised management practices and provided increased value from their commodities and avoided the costs (economic, environmental and social) of 'conventional' markets (Higgins, Dibden, & Cocklin, 2008).

The use of quality assurance standards can facilitate the differentiation of food products and provides a potential mechanism for achieving increased sales and premium prices (Morris, 2000). However, many of the attributes of LWP that could be utilised to develop a value added product are credence attributes which cannot be detected by the consumer during consumption (Northen, 2001). Communicating the authenticity of products and production characteristics has typically occurred through face to face interaction such as farmers markets (Kirwan, 2006). This poses a significant challenge for LWP in which Synlait must attempt to market a product with credence attributes and deliver the same principles typically communicated through personal interaction, through a more diverse and expansive marketing channel. Higgins et al. (2008) summarises this challenge well, noting that there is often a lack in market demand that enables farmers to gain a premium, due to a lack of understanding, concerning the meaning of certification systems amongst consumers. This means considerable work is required to create markets for certified products. This shows that these issues are not new or unique to LWP and development of effective marketing

initiatives to communicate the unique production attributes to consumers requires future research. Atari et al. (2009) identifies that there are limited, if any, mechanisms similar to that of certified organic or fair-trade products, that allow consumers to explicitly purchase environmental stewardship characteristics associated with agricultural commodities. Establishing a product connected to LWP is important for Synlait in ensuring its suppliers remain engaged with LWP. Higgins et al. (2008) recognise that a reduction in interest from farmers to continue involvement in environmental schemes, occurs in the absence of significant consumer demand. Furthermore, this provides some explanation for the desire, for a marketable product to be derived from the LWP milk stream, recognising that when farmers continue to see their product sold through conventional markets, despite the differentiation of production practices on farm they begin to question their efforts. LWP presents a unique value proposition in that it is an independent producer led scheme and not a generic industry wide programme. A survey of Scottish meat producers found that producer-led labels were clearly preferred by respondents compared to label types sponsored by independent associations (e.g. organic labels, added welfare labels such as the Royal Society for the Prevention of Cruelty to Animals' (RSPCA) 'Freedom Food') or retailer assurance labels (McEachern & Warnaby, 2005).

Suppliers identified that they felt pressure from the public to conform to more sustainable dairying practices and that this was a consideration in their participation in LWP. However, more importantly they expressed a desire for their practices and alignment and willingness to conform to public demands to be better understood. Atari et al. (2009) highlighted that the widespread implementation of environmental farm schemes can help with improving the public's perception of farm operations and seems to be the response by many farmers in alleviating public concerns through more proactive management and stewardship practices. This is positive for LWP and identifies its role within ensuring the social licencing of dairy farming within New Zealand. The utilisation of private market-oriented standards has been identified in the literature as an additional means by which farmers involved in direct and proximate selling can gain consumer trust (Higgins et al., 2008). Furthermore, the concerns of suppliers surrounding societal perceptions align with their desires for a marketable product (as discussed above), in which socially acceptable farming practices may be more effectively communicated to consumers. It is commonly misconceived by the wider public

that agriculture has no moral purpose beyond the economic goals of production and efficiency, despite the fact that goals actually extend to self-reliance and connections to the land and community (Fairweather & Keating, 1994). Programmes such as LWP provide a key role in ensuring this perception is not misunderstood and allow for effective and accurate communication of farmers dedicated to ensuring sustainable futures, whilst simultaneously providing an additional means for assisting in programme adoption.

5.1.1.3 Control Beliefs

Control beliefs were a less important factor influencing adoption and themes identified within this characteristic (discussed below) were often considered following the decision to adopt. This is largely due to adoption of LWP being a voluntary decision, however control beliefs still captured considerations relating to the programme's influence upon the farming business and the extent to which this could be manipulated by the individual supplier.

The inclusion of suppliers within the standards committee - who review and consider the development of new standards – was felt to be integral to them having a say as to the direction of the programme. The implementation of agri-environmental policy can have significant associated farm-level transactions costs that adversely impact upon participation rates, which means developing an understanding of farmer attitudes surrounding these has considerable value (Falconer, 2000). This highlights the importance of the standards committee in ensuring that suppliers are considered within the development of LWP standards and changes, ensuring consultation, particularly regarding the impact upon practical on-farm implementation. This was evident through suppliers' appreciation of the ability to participate in the programme's development to ensure it remained in line with practical application to the farming enterprise. Farmers are commonly passive recipients and not active participants in the development of policy and allowing for the involvement of participants in the development process ensures an interaction between the scheme development and the formation of attitudes of those relevant to the scheme (Falconer, 2000).

González and Nigh (2005) have recognised that setting standards in an agricultural context is often developed with regard to the consumer and imposed upon farmer producers in a top

down fashion, with little to no farmer participation. Giovannucci and Ponte (2005) further reinforce this in the context of private certification systems, noting the impact upon credibility of the failure of farmer inclusion in the development of conducts and guidelines. This puts LWP in a unique position where farmers have, and value the opportunity to be involved within this process. This gives them a perceived control over the programme's implementation.

Voluntary participation in the programme was a factor considered to be very important to suppliers and gave them absolute control in the decision to adopt. (Aarts and van Woerkum 2000, p. 27 as cited in Siebert, Toogood, & Knierim, 2006)) recognise voluntary participation as an essential psychological principle of control. The literature discusses the importance of voluntary adoption in the context of best practice schemes highlighting that voluntary programmes are more efficient than a programme that mandates adoption, provided there are no negative social financial implications compared with that of a mandatory approach (Wu & Babcock, 1999). Khanna (2001) reinforces this finding, recognising that voluntary approaches have the potential to increase the efficiency and effectiveness of environmental regulations. A shift to voluntary approaches to best practice represents a significant change and movement away from the command and control government push approach employed traditionally (Khanna, 2001). This aligns with the aspiration of Synlait's LWP programme in which the company seeks to transform the industry through its programme and highlights the importance of changing how farms achieve best practice performance (Synlait Milk Ltd, 2017b). Voluntary participation in schemes has been identified as being more prevalent in the presence of strong regulatory threat (Alberini & Segerson, 2002). This provides Synlait with an advantage, given that Canterbury is under environmental scrutiny and enforcement by the local regional council.

5.1.1.4 Consideration of future adoption implications

The results revealed an extension of the model presented by Reimer et al. (2012), that highlighted the consideration of future implications of LWP upon farming enterprises operations. This is not surprising, given that adoption of LWP is a voluntary decision meaning they are not concerned with control over adopting (as this is fully theirs) and instead focus on

the control of implementation. Informants considered what impact adoption may have in the coming years referring to such variables as how they met the certification requirements and the amount of time they could work towards certification. Prokopy et al. (2008) has previously highlighted this as an issue within adoption studies noting that most studies model only the decision to adopt and not the decision to continue the practice. This shows that suppliers went beyond considering control of adoption and considered the control over the programme's operation within their farm system once they have adopted it. This finding aligns with Morris et al. (2000) who recognised that despite the vast use of the diffusion of innovation theory, it is commonly criticised for being prescriptive, static and deterministic, and evoking a linear process for the progression from awareness through to adoption. The dynamic nature of the decision to adopt means other factors influence the decision beyond the model utilised in this research, in this instance, the influence of future implications. Considering only the present implications of adoption presents risk further down the track and given the long-term investment nature of farming operations, suppliers tended to consider these factors. This predominantly related to the control beliefs, in which farmers considered the control they would have over the implementation of LWP in the future, rather than that of the direct decision to adopt at the decision time. This was also raised by non-adopters showing that this not only had an impact upon the considerations of those who did adopt, but also acted as a significant barrier to those who outright did not wish to adopt. Therefore, this research presents an extension to Reimer et al. (2012) theory (Figure 9) which shows a less direct influence upon adoption relating to control around continuation of LWP. This shows that the design of farm assurance programmes requiring changes in production practice to implement BMPs must place emphasis on allowing flexibility in applications to individual farmers.

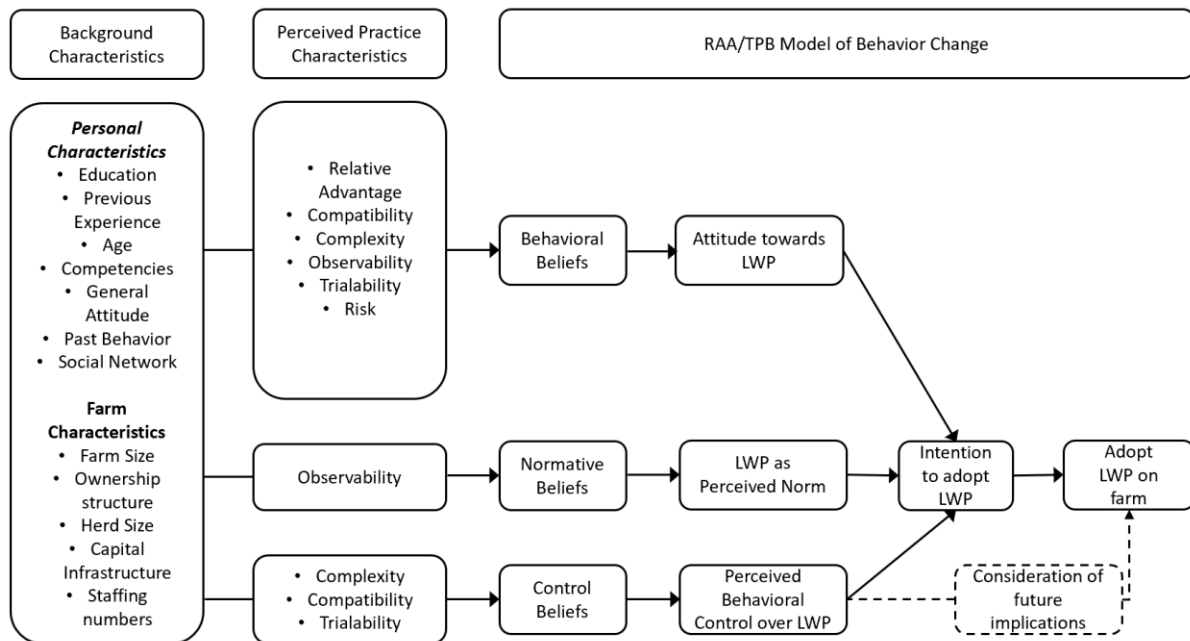


Figure 9 Consideration of future implications (shown by dashed line) adapted from Remier et al., (2012) p. 119

5.1.2 Financial Evaluation

The financial analysis found that there could be possible profitable outcomes from adopting LWP. An analysis of financial informant farms equated this to be just under \$62,000. The following paragraphs discuss the results of assessing the financial implications of adoption and their impact upon programme adoption, relating this back to the findings from the case study interviews to understand factors influencing programme adoption.

Clearly the financial results will vary significantly for individual farms. This is because many of the factors considered within the financial evaluation are very specific to individual farms. Whilst this subjectivity was somewhat offset by averaging the results of three case study farms, individual farm results deviate significantly from these averages, as each enterprise has individual constraints and means by which they operate their production systems. The calculations also assume that these practices were not being adopted within the farm system prior to adoption of LWP. It is recognised that some requirements may already have been implemented for some suppliers. Specific factors commonly relate to individuals' perceptions such as variation in diagnosis of clinical lameness due to the different skills of personnel responsible for identifying lame cows (Green, Hedges, Schukken, Blowey, &

Packington, 2002). Therefore, the results provide an indication of what may be expected in pasture-based Canterbury dairy systems; however, the generalisation of these results is a limitation of the research.

A review of LWP motivation and adoption factors highlighted the impact monetary value has on decision making amongst farmers and provided a case for an assessment of the financial implications of adoption of BMP. The possible financial implication heavily influences perceived relative advantage and can either drive adoption through positive outcomes or reduce adoption through negative financial implications. As previously discussed, premium payments were a major factor influencing relative advantage of participating farms due to the impact they had upon farm profitability. Communicating the profitability of LWP implementation will have a significant effect on assisting in increasing the adoption of LWP. Barkema et al. (2015) found that the profitability of the practice is believed to have a positive impact on adoption through influencing farmers perceived economic impact of a given BMP. Communicating the monetary benefits associated with adoption, particularly those beyond the obvious premium payments may positively impact upon relative advantage and consequential attitudes and adoption of LWP. Main et al. (2014) recognised that exploring the financial viability of farm assurance scheme adoption is important as it has the potential to highlight win-win situations, where production practice benefits can occur simultaneously alongside productivity and economic benefits and can be part of a scheme's intervention strategy.

The sections that follow discuss the outcomes of the financial evaluation from each pillar, considering their significance and role within farm assurance programs and future developments. The key areas driving profitable outcomes are contrasted against previous findings within the literature.

5.4.1 Environment

A number of environmental requirements of the LWP were classified as mandatory. Many of these requirements are now incorporated as good management practices within Farm Environment Plans. Farm Environment Plans were not a requirement at the time the

programme requirements were written suggesting that while a number of the environmental requirements remain relevant, they are no longer ahead of industry requirements.

Consequently, it would be recommended that the environmental requirements were reviewed to see if new requirements not yet required by industry could be added to ensure the programme remains at the forefront of industry developments.

Environment also represented the pillar with the largest associated costs required to meet certification. This is hardly surprising given that the requirements to offset impacts, implement best practice and meet compliance with regards to environmental factors, require high levels of investment and capital infrastructure (Macdonald, 2014). These capital costs included the notable expense of an effluent fail safe which ensures an irrigator stops applying effluent if it stops moving. The financial implication of capital cost is important as it acts as a primary barrier to adoption which was noted by all non-adopter informants.

Beukes, Gregorini, Romera, Levy, and Waghorn (2010) suggest that implementation of strategies to reduce electricity use can help to decrease GHG emissions whilst also increasing profitability on a pasture based New Zealand dairy farm. The findings from this research also found there to be reasonable electricity savings. Reasonable cost benefits in reduced electricity usage can be linked to the fact that these represent a significant initial cost in the first instance with electricity consumption on pasture-based dairy farms in New Zealand representing 25% of total energy use (Wells, 2001 as cited in Upton et al., 2013). LWP requires there to be benchmarking of electricity which creates an awareness of this factor, however there are no actual requirements for reductions. Whilst awareness has been identified as an important factor when introducing new concepts, the next step would be to include requirements for reduction of electricity usage through the implementation of new technologies such as variable speed drive technology (Upton et al., 2013). Implementation of these technologies has previously demonstrated improvements on New Zealand dairy farms (Morison et al., 2007 as cited in Upton et al., 2013).

5.4.2 Milk Quality

Complying with the milk quality components of LWP led to costs as well as benefits. Costs related predominately to training fees, whilst benefits were obtainable through reduced grading incidences and were directly attributable to the premium given for remaining grade free.

A study conducted utilising United States milk cooperative data found that premiums offered for producing high quality milk had a strong effect on the overall milk quality produced by the population affected by the premium (Nightingale, Dhuyvetter, Mitchell, & Schukken, 2008). Lead With Pride contains an incentive, related directly to milk quality, with the requirement for farms to be grade free and findings from this study align with those within the literature that reduced grading, and hence improved milk quality can be linked to incentive payments. Lead With Pride encompasses many factors within its requirements to help address milk quality on farm. Flores-Miyamoto, Reij, and Velthuis (2014) recognise that adequate maintenance, appropriate milk cooling, rubberware replacement programmes and defined cleaning procedures are all factors that influence milk quality. This provides reasons why there may be reduced grading amongst Lead With Pride certified suppliers, as they utilise the programme's framework to apply many of these elements within their business. This is further supported by Rasmussen, 2000 as cited in Rodrigues and Ruegg (2005) who emphasise the importance of defined milking practices for improving udder health.

Reduced grading incidences can also be related to increased training. Whilst there is a cost associated with the requirement for completion of stage one and stage two Primary ITO courses, this education can assist with ensuring staff have sufficient understanding of important tasks related to the milking of cows. (Stup et al., 2006) note that production outcomes such as milk quality are a direct result of employee performance and human resource management practices such as standard operating procedures and continued training. A link has been established between raw milk quality improvements and increased hygiene awareness of farmers through training (Nada, Ilija, Igor, Jelena, & Ruzica, 2012). This would suggest that the requirements for milk quality training and the SOPs required with Lead With Pride are factors that assist in improving the farm milk quality and reducing

grading incidences which impact upon farm profitability. Rodrigues and Ruegg (2005) report a lack of awareness amongst dairy farmers of the importance of training for improving herd performance. LWP helps to facilitate awareness through education and imposes practices which have been shown to reduce grading incidences that impact upon farm profitability.

Milk quality can also bring a number of benefits to the processor, in this instance Synlait, allowing them to achieve more efficient processing of higher-quality products improving their return on their investment (Murphy, Martin, Barbano, & Wiedmann, 2016). It is important to note however that while Lead With Pride has been seen to reduce grading incidence it does not allow for total prevention and certified farms still had instances of inhibitory substances and other more minor milk quality incidences.

5.4.3 Animal Health and Welfare

Animal health and welfare had the most significant impact upon increasing the profitability amongst the case study farms. Small improvements in practices had great impact upon the profitability of case study farms demonstrating that this area has the potential for some quick wins. The significance of animal health and its potential to positively impact upon farm profitability is driven by the fact that animal health is an important factor influencing the economic efficiency of a dairy herd (Young, Eidman, & Reneau, 1985).

Poor heifer management is already a known factor of economic loss within dairy systems amongst the literature (Bazeley, Barrett, Williams, & Reyher, 2016). The growth of heifers has long been associated with responses in lactation at first milk (Bach and Ahedo, 2008 cited in Bazeley et al., 2016). A number of studies have reported similar responses to those within this study's calculation with Dobos et al. (2001) reporting a response of 0.42 kg of milksolids per kg of live weight at first calving, whilst Van der Waaij, Galesloot, and Garrick (1997) found 0.43 kg of milk solids per kg of live weight. Given the larger scale of Canterbury dairy farms it is hardly surprising that this factor represents a significant benefit. To validate findings specific to the requirements of Lead With Pride and the farms involved, a more in-depth study tracking the difference between heifers weighed and not weighed as per the programme requirements and their responses at lactations one and two recorded, would be required. The calculation utilised in this study provides an indication as to an anticipated

response; however, it fails to consider other factors that may impact upon milk solid responses.

Findings suggested that reduced costs from cases of clinical mastitis had a significant positive financial implication. The literature has widely identified economic benefits deriving from reduction in mastitis (Allore and Erb, 1998; Yalcin et al., 1999; Seegers et al., 2003 as cited in Valeeva, Lam, & Hogeveen, 2007). Huijps, Lam, and Hogeveen (2008) found similar results in their study focusing on the economics of mastitis, which identified culling due to mastitis as a large factor causing economic losses in dairy systems. Furthermore incentives directly related to somatic cell count have been found to have a positive effect upon mastitis management (Nightingale and Schukken, 2005; Rodrigues and Ruegg, 2005 as cited in Valeeva et al., 2007). This emphasises the importance a premium directly related to reduced somatic cell count has, in achieving positive financial implications for farms. Savings relating to reduced mastitis highlight the importance of early identification through thorough record keeping. Regardless of whether a farm assurance programme is in operation within a given enterprise, farmers typically review their animal health as it is a well-known factor affecting farm profitability. However, farm assurance programs provide the framework which allows for a thorough review and ensures a detailed focus on known factors of BMP. This was reinforced throughout interviews in which suppliers identified the role LWP played with stimulating discussion and action that may not have otherwise occurred.

Lameness records from farms calculated a financial benefit of \$1,546.67. The findings from this research align with those within the literature which have reported lameness as being well known for causing major economic effects within pasture based dairy systems (Ettema, Østergaard, & Kristensen, 2010). Lameness presents a reasonable loss because it impacts on multiple facets of the dairy business including decreased milk production, weight loss, death, culling, decreased reproductive performance, and treatment costs (Green et al., 2002). Weaver, 1984 as cited in Warnick, Janssen, Guard, and Gröhn (2001) recognise the importance of accurate recording in addressing lameness on farm, noting that herd health programs need to move away from recording lameness as a single entity and towards recording individual causes of lameness. This aligns well with the requirements for lameness

cases and causes to be recorded within LWP and the opportunity it provides for allowing early detection and treatment, to minimise impacts on milk yield and treatment costs.

5.4.4 Social Responsibility

The social responsibility pillar of Lead With Pride had no direct financial benefits. This pillar was characterised by several aspects that were either mandatory requirements by existing New Zealand legislation or factors that had no directly relatable economic benefit. Whilst many of these factors are mandatory requirements by legislation, many suppliers thought that compliance with these rules would be at a low level throughout the industry due to the fact they were not specifically audited. Many of them recognised that they were not entirely compliant with some of these factors prior to certification.

The social responsibility pillar did however present several benefits captured within the interviews which assessed the program regarding its adoption, with respect to relative advantage. For many the formalisation of their people management through Lead With Pride meant they were more compliant with legislation than prior to the programme's adoption. Previous research has found that managers of dairy farms struggle with the transition to human resource management (Stup et al., 2006). Providing a means to facilitate this transition is key to improving the social responsibility practices of dairy farms.

HRM can result in sustainable competitive advantages for firms (Stup et al., 2006); however studies have found that these practices do not significantly affect dairy farm productivity and profitability (Gloy, Hyde, & LaDue, 2016; Stup et al., 2006). Despite this, employee performance can play a major role in creating value by either decreasing operational costs or increasing revenue on dairy farms (Mugera & Bitsch, 2005). There may also be other business outcomes that are more directly related to human resource management practices such as employee turnover, employee job satisfaction, or owner satisfaction (Stup et al., 2006). Many of these factors were excluded from the research as they are subject to a number of other operational elements within the farm business.

5.2 Limitations

The findings of this study are subject to several limitations. Informants were selected using theoretical sampling. Whilst this provided the study with informants who could provide rich data due to their extreme involvement within the programme, it also provided bias towards strong opinions. This meant the findings did not necessarily reflect those of an average supplier.

There are significant limitations for the assessment of financial implications relating to adoption of LWP. Conducting a financial analysis of BMPs is difficult given the varying means by which individual farms conduct their business and leads to extreme variability in costs and benefits. The benefits discussed may not be specific to LWP and could be achieved without implementing the programme and therefore the benefits are not exclusively to those certified suppliers. However, LWP provides the framework by which these are more likely to be adopted by farmers. Furthermore, these benefits are extremely subjective based upon the farm involved in the analysis. This study has attempted to provide an average financial evaluation that at best considers this variability to present a conclusive return from adopting BMP. The findings from this study only provide an indication of the possible financial implications of adopting LWP utilising findings from three informant farms. Therefore, the generalisation of results is difficult to apply across other dairying systems particularly those in regions outside of Canterbury. Furthermore, the theoretical model adopted shows farmers' personal characteristics (background characteristics) heavily influence their adoption behaviours. Therefore, the applicability of results is limited, due to the significant influence individuals have on adoption behaviours. A wider population would be required to make these results more generalisable. Importantly, this would have to include farms outside Canterbury which are commonly characterised by their larger size in comparison to other regions of New Zealand.

Capturing data over a longer period of time would allow for more accurate results to be obtained. This would allow for an accurate direct comparison between implications both pre and post certification. It would reduce the reliance on farms which had kept accurate records, allowing the use of a wider range of farms. This would ensure that the study was

not just informed by farms that keep good records which may be reflective of better farm performance. This may have affected the outcome of the analysis of the financial impact. Whilst the study cannot categorically determine a definitive financial evaluation, it does provide general evidence that farm assurance schemes can provide profitable outcomes for participating farms. However, clearly some of the differences noted within the financial analysis may have been influenced by external factors, that is those outside of the control of the business. An example of this may be the influence of weather on the level of power savings. For example, milk cooling costs may have been higher in the pre-certification period due to a hotter summer leading to an understating of power savings (or vice versa).

Finally, a key limitation was the need to make a range of assumptions for the analysis of the financial impact. In order to not overstate the financial impact, caution was exercised in the process, in terms of the factors that were included. However, it could mean that factors were excluded which could have influenced the level of benefit. This does mean that the results of the financial impacts are only an estimate and it would be expected that there would be large variation in the benefit obtained by individual farms.

5.3 Future Research

The research has highlighted a gap in the understanding of adoption behaviours relating to consideration of future impacts. Future research needs to develop understanding of these future perceived impacts that may influence decisions to adopt. In depth interviews focusing on the extent of consideration a farmer gives to adoption would help to capture this information. This would allow farm assurance scheme providers to understand the emphasis that needs to be placed on giving potential adopters insight in to the future benefits obtained through programme adoption. A more detailed cost benefit analysis would provide a better assessment of the financial implications of adoption of a BMP farm assurance programme. This would need to include a more detailed analysis of the social responsibility pillar which allowed for an accurate representation of those factors difficult to measure and excluded in this research (such as employee turnover). As mentioned in the previous chapter, ideally future research would be conducted over a period which allowed for changes in cost and benefits to be accurately monitored from pre, through to post adoption. A representative

sample of farms would be required to make results more generalisable. Presenting this data to farms would allow scheme providers to understand the threshold at which profitability can significantly influence the decision to adopt. Whilst this research identified a possible extension upon the model presented by Reimer et al. (2012), relating to the consideration of adoption implications in the future, further research would be required to test and validate this.

5.4 Research Summary

This study examined farmers' perceptions and motivations for adopting whole farm assurance programmes and gave insight into the perceived advantages and disadvantages in adopting them. Furthermore, it sought to estimate the possible financial implications of adopting a whole farm assurance programme to determine if this could be used as a factor to promote adoption.

The method used to gather this information was a case study approach utilising Synlait Milk's Lead With Pride programme. Thirteen informant farms (10 certified and 3 non-certified) were selected to participate in semi-structured interviews using theoretical sampling, upon their extremes of involvement within the programme. The theoretical model of adoption behavior that informed this study was adapted from Reimer et al. (2012). Interviews were transcribed, coded and interpreted using inductive analysis methods to help identify themes among the research participants. Thematic analysis was utilised to distinguish patterns that occurred throughout the data and qualitative content analysis determined the significance of a given theme. The content analysis adopted a mixed inductive and deductive approach. Deductive categories were constructed from the Reimer et al. (2012) model to allow categorisation of concepts.

The literature revealed that relative advantage was a key influence upon scheme adoption, with financial advantage being a significant component of this. Consequently, an analysis of the potential financial implications of LWP adoption was conducted to determine if inclusion of BMPs within the farming system could result in positive financial outcomes. Requirements were first classified as either mandatory, quantifiable or non-quantifiable. Mandatory

requirements were those required of suppliers regardless of participation in LWP and were excluded from the financial evaluation. Quantifiable requirements were those which were quantifiable and had an associated measurable parameter as a direct result of a programme requirement. These were the focus of the financial evaluation. Non-quantifiable requirements were those which had no associated measurable parameter and were not included within the financial evaluation. Wossink and Osmond (2002) model was utilised to perform the financial analysis. This model adopts the net present value method to assess the net profitability of BMP. Prices were calculated for quantifiable requirements with the cost of a practice subtracted from the increases in revenue. The change in return added to the LWP premium of \$0.06/kgMS provided a net addition to the annual profitability of the farm. Where possible, records from three participant farms were obtained to ensure actual data of the measurable parameters accurately reflected the economic effect of LWP. Where farms had no records of quantifiable requirements, industry data and scientific literature were utilised. The 2016/2017 season milk price of \$6.30 was used for any milk production related calculations. Major capital expenditure was excluded, including requirements to change irrigation or changes to effluent systems. Suppliers recognised that these investments were required due to compliance or operation.

Behavioral beliefs were the overwhelming influence on the decision to adopt LWP and these were largely driven by factors of relative advantage, compatibility with farm systems, observability and complexity. Elements of these factors also influenced the normative and control beliefs which are discussed below.

An individual's belief attitudes towards LWP adoption were influenced by the extent they perceived there to be a relative advantage in participating, with more perceived advantages increasing the likelihood of adoption. The main influences upon relative advantage included premium payments, accountability, record keeping and proactiveness to industry changes and compliance. The strong influence of relative advantage in a supplier's decision to adopt LWP is strengthened by the fact that the other perceived practice characteristics from the model can influence it. The Social Responsibility pillar of LWP was identified as requiring the most change to on-farm practices. This negatively impacted upon the supplier's behavioural beliefs and decision to adopt LWP as they had to alter their farm systems with the adoption

of unfamiliar practices. However, compatibility could also positively influence behavioural beliefs, allowing farms to choose to apply new practices that enhanced their operation, helping to improve adoption rates.

Suppliers identified the development of a product linked to LWP, as having the potential to create opportunities allowing market premiums for changes in production practices. Utilising this concept to increase adoption is a difficulty because the production practices of LWP are largely credence attributes, which cannot be detected by the consumer during consumption and are therefore difficult to market. Suppliers expressed a desire for their practices and willingness to conform to public demands, to be better understood. This suggested that observability influenced suppliers' normative beliefs, and that adoption could be motivated by the ability of the program to be observed by the public and practice outcomes more widely understood.

Control beliefs also influenced supplier adoption behaviour and their continued involvement in Lead With Pride. Suppliers inclusion within the Standards Committee (which reviews and considers the development of new standards) allowed them to provide insight on the direction of the programme and ensure its requirements remained practical and simplistic behind the farmgate. Those who had participated found it improved their attitudes relating to adoption, as they felt a sense of influence and assurance that their opinion would be considered within the programme's development.

The financial analysis highlighted a possible profit increase. This was obtained through the environmental, AHW and MQ pillars. There were no quantifiable returns in the SR pillar. The study identified that a reasonable capital expenditure outlay was required to meet certification requirements, however this was easily recoverable through the first year of certification. The financial viability of FAS adoption is important as it has the potential to highlight win-win situations, which may influence adoption behaviours. The environmental pillar included the most significant capital cost requirements. The largest environmental benefit came from savings relating to energy usage, particularly in the dairy shed and irrigation. Analysis of Synlait milk data showed reduced grading instances amongst LWP suppliers, which beyond the grade free incentive, was the main benefit of the MQ pillar.

Suppliers credited the establishment of systems and procedures in reducing instances of milk grading. AHW benefits were mainly attributable to reduced culling from mastitis and achieving heifer liveweight targets. FAS provides frameworks allowing for a thorough review and ensures a detailed focus on known factors of BMP to enhance performance and profitability of dairy enterprises.

The findings show similarities with previous studies found in the literature. For example, this study reaffirms the findings of previous studies that found relative advantage as the major influence on adoption. The weighting of different behavioral intentions is also consistent with other research as previous studies on farmer adoption behaviors have concluded that correlations between attitudes and behavioural intent are stronger than those between subjective norms and behavioural intent.

The findings revealed an extension of the model presented by Reimer et al. (2012), highlighting the consideration suppliers gave to the future implications LWP may have upon their businesses. It was found that an important consideration influencing the adoption behaviour included the long-term impact of adopting LWP and the influence this may have on supplier's farm systems to ensure they remained certified. This shows that adoption may not be influenced by just three beliefs in the present but considers these in terms of their future influence.

The results of the financial evaluation suggest that implementation of BMPs administered through structured farm assurance programmes can deliver profitable returns for dairy farm enterprises. Significant benefits can be obtained through the implementation of animal health and welfare practices that go above and beyond the existing legislative and supplier agreement requirements. This adds to the argument for the strong role communication of financial benefits can have in strengthening relative advantage and ultimately driving adoption. The strong influence of behavioral beliefs suggests that the promotion of adoption of LWP amongst suppliers should place emphasis on outcome-based prescriptions rather than elements of normative beliefs.

Together the interviews and financial analysis have provided evidence that programmes requiring best practice can be both profitable and have numerous associated benefits that are returned within the farm gate. It is these influences that can help increase adoption of farm assurance schemes amongst farmers.

References

- Abebe, G. K., Bijman, J., Pascucci, S., & Omta, O. (2013). Adoption of improved potato varieties in Ethiopia: The role of agricultural knowledge and innovation system and smallholder farmers' quality assessment. *Agricultural Systems*, 122, 22-32. doi:<https://doi.org/10.1016/j.agsy.2013.07.008>
- Abubakar, M., & Ahmad, A. (2017). Development of Farm Records Software. *Arid Zone Journal of Engineering, Technology and Environment*, 13(6), 743-763.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, 26(9), 1113-1127. doi:10.1080/08870446.2011.613995
- Alberini, A., & Segerson, K. (2002). Assessing Voluntary Programs to Improve Environmental Quality. *Environmental and Resource Economics*, 22(1-2), 157-184.
- Alvarez, J., & Nuthall, P. (2006). Adoption of computer based information systems: The case of dairy farmers in Canterbury, NZ, and Florida, Uruguay. *Computers and Electronics in Agriculture*, 50(1), 48-60. doi:<https://doi.org/10.1016/j.compag.2005.08.013>
- Archer, S. C., McCoy, F., Wapenaar, W., & Green, M. J. (2013). Association between somatic cell count early in the first lactation and the longevity of Irish dairy cows. *Journal of Dairy Science*, 96(5), 2939-2950. doi:<https://doi.org/10.3168/jds.2012-6115>
- Atari, D. O., Yiridoe, E. K., Smale, S., & Duinker, P. N. (2009). What motivates farmers to participate in the Nova Scotia environmental farm plan program? Evidence and environmental policy implications. *Journal of Environmental Management*, 90(2), 1269-1279.
- Bailey, A. P., & Garforth, C. (2014). An industry viewpoint on the role of farm assurance in delivering food safety to the consumer: The case of the dairy sector of England and Wales. *Food Policy*, 45, 14-24. doi:<http://dx.doi.org/10.1016/j.foodpol.2013.12.006>
- Barkema, H., Von Keyserlingk, M., Kastelic, J., Lam, T., Luby, C., Roy, J.-P., . . . Kelton, D. (2015). Invited review: Changes in the dairy industry affecting dairy cattle health and welfare. *Journal of Dairy Science*, 98(11), 7426-7445.
- Basset-Mens, C., Ledgard, S., & Boyes, M. (2009). Eco-efficiency of intensification scenarios for milk production in New Zealand. *Ecological Economics*, 68(6), 1615-1625. doi:<https://doi.org/10.1016/j.ecolecon.2007.11.017>
- Batte, M. T. (2005). Changing computer use in agriculture: evidence from Ohio. *Computers and Electronics in Agriculture*, 47(1), 1-13.
- Baumgart-Getz, A., Prokopy, L. S., & Floress, K. (2012). Why farmers adopt best management practice in the United States: A meta-analysis of the adoption literature. *Journal of Environmental Management*, 96(1), 17-25. doi:<http://dx.doi.org/10.1016/j.jenvman.2011.10.006>

- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13(4), 544-559.
- Bazeley, K. J., Barrett, D. C., Williams, P. D., & Reyher, K. K. (2016). Measuring the growth rate of UK dairy heifers to improve future productivity. *The Veterinary Journal*, 212, 9-14. doi:<https://doi.org/10.1016/j.tvjl.2015.10.043>
- Beukes, P. C., Gregorini, P., Romera, A. J., Levy, G., & Waghorn, G. C. (2010). Improving production efficiency as a strategy to mitigate greenhouse gas emissions on pastoral dairy farms in New Zealand. *Agriculture, Ecosystems & Environment*, 136(3), 358-365. doi:<https://doi.org/10.1016/j.agee.2009.08.008>
- Blackman, A., & Rivera, J. (2010). *The Evidence Base for Environmental and Socioeconomic Impacts of "Sustainable" Certification*. Retrieved from <http://EconPapers.repec.org/RePEc:rff:dpaper:dp-10-10-efd>
- Boardman, A. E. (1996). *Cost-benefit Analysis: Concepts and Practice*: Prentice Hall.
- Boyd, C. E. (2003). Guidelines for aquaculture effluent management at the farm-level. *Aquaculture*, 226(1), 101-112.
- Brownlie, T. S., Morton, J. M., Heuer, C., Hunnam, J., & McDougall, S. (2014). Reproductive performance of seasonal-calving, pasture-based dairy herds in four regions of New Zealand. *New Zealand Veterinary Journal*, 62(2), 77-86. doi:10.1080/00480169.2013.848499
- Bruijnjs, M. R. N., Hogeveen, H., & Stassen, E. N. (2010). Assessing economic consequences of foot disorders in dairy cattle using a dynamic stochastic simulation model. *Journal of Dairy Science*, 93(6), 2419-2432. doi:<https://doi.org/10.3168/jds.2009-2721>
- Burton, R. J. (2004). Reconceptualising the 'behavioural approach' in agricultural studies: a socio-psychological perspective. *Journal of Rural Studies*, 20(3), 359-371.
- Cabrera, V. E., Breuer, N. E., & Hildebrand, P. E. (2008). Participatory modeling in dairy farm systems: a method for building consensual environmental sustainability using seasonal climate forecasts. *Climatic Change*, 89(3-4), 395-409.
- Campbell, H., Rosin, C., Hunt, L., & Fairweather, J. (2012). The social practice of sustainable agriculture under audit discipline: Initial insights from the ARGOS project in New Zealand. *Journal of Rural Studies*, 28(1), 129-141. doi:<http://dx.doi.org/10.1016/j.jrurstud.2011.08.003>
- Cary, J. W., Webb, T., & Barr, N. F. (2001). The adoption of sustainable practices: Some new insights. *Land & Water Australia, Canberra*, 2005.
- Cha, E., Hertl, J., Bar, D., & Gröhn, Y. (2010). The cost of different types of lameness in dairy cows calculated by dynamic programming. *Preventive Veterinary Medicine*, 97(1), 1-8.
- Chagunda, M. G., Mwangwela, A., Mumba, C., Dos Anjos, F., Kawonga, B. S., Hopkins, R., & Chiwona-Kartun, L. (2016). Assessing and managing intensification in smallholder dairy systems for food and nutrition security in Sub-Saharan Africa. *Regional Environmental Change*, 16(8), 2257-2267.

- Clark, D., Caradus, J., Monaghan, R., Sharp, P., & Thorrold, B. (2007). Issues and options for future dairy farming in New Zealand. *New Zealand Journal of Agricultural Research*, 50(2), 203-221.
- Clemens, R. L., & Babcock, B. A. (2004). Country of origin as a brand: The case of New Zealand lamb.
- Cronshaw, T. (2013). Synlait plan can boost milk return. *The Press*.
- Daberkow, S. G., & McBride, W. D. (2003). Farm and operator characteristics affecting the awareness and adoption of precision agriculture technologies in the US. *Precision agriculture*, 4(2), 163-177.
- Dagg, P., Butler, R., Murray, J., & Biddle, R. (2006). Meeting the requirements of importing countries: practice and policy for on-farm approaches to food safety. *Rev Sci Tech*, 25(2), 685-700.
- DairyNZ. (2016). New Zealand Dairy Statistics 2015-16. Retrieved from <https://www.dairynz.co.nz/media/5416078/nz-dairy-statistics-2015-16.pdf>
- DairyNZ (Producer). (2017, 29/01/2018). Trees on farms. Planting for biodiversity. Retrieved from https://www.dairynz.co.nz/media/5447634/Planting_for_biodiversity.pdf
- DairyNZ. (n.d.). Benefits of Heifer Liveweight Targets. Retrieved from <https://www.dairynz.co.nz/animal/heifers/liveweight-targets/>
- DaviDe Menozzi, M. F., Michele Donati. (2015). Farmer's motivation to adopt sustainable agricultural practices. *Bio-based and Applied Economics*, 4(2), 125-147.
- de Buck, A. J., van Rijn, I., Roling, N. G., & Wossink, G. A. A. (2001). Farmers' reasons for changing or not changing to more sustainable practices: An exploratory study of arable farming in the Netherlands. *The Journal of Agricultural Education and Extension*, 7(3), 153-166. doi:10.1080/13892240108438817
- Dobos, R., Nandra, K., Riley, K., Fulkerson, W., Lean, I., & Kellaway, R. (2001). Effects of age and liveweight at first calving on first lactation milk, protein and fat yield of Friesian heifers. *Australian Journal of Experimental Agriculture*, 41(1), 13-19.
- Douphrate, D. I., Hagevoort, G. R., Nonnenmann, M. W., Lunner Kolstrup, C., Reynolds, S. J., Jakob, M., & Kinsel, M. (2013). The dairy industry: a brief description of production practices, trends, and farm characteristics around the world. *Journal of agromedicine*, 18(3), 187-197.
- Duffy, R., & Fearne, A. (2009). Value perceptions of farm assurance in the red meat supply chain. *British Food Journal*, 111(7), 669-685. doi:<http://dx.doi.org/10.1108/00070700910972369>
- Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, 14(4), 532-550. doi:10.2307/258557
- Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative Content Analysis: A Focus on Trustworthiness. *SAGE Open*, 4(1), 2158244014522633. doi:10.1177/2158244014522633

- Enting, H., Kooij, D., Dijkhuizen, A. A., Huirne, R. B. M., & Noordhuizen-Stassen, E. N. (1997). Economic losses due to clinical lameness in dairy cattle. *Livestock Production Science*, 49(3), 259-267. doi:[https://doi.org/10.1016/S0301-6226\(97\)00051-1](https://doi.org/10.1016/S0301-6226(97)00051-1)
- Ettema, J., Østergaard, S., & Kristensen, A. R. (2010). Modelling the economic impact of three lameness causing diseases using herd and cow level evidence. *Preventive Veterinary Medicine*, 95(1), 64-73. doi:<https://doi.org/10.1016/j.prevetmed.2010.03.001>
- Fabian, J., Laven, R. A., & Whay, H. R. (2014). The prevalence of lameness on New Zealand dairy farms: A comparison of farmer estimate and locomotion scoring. *The Veterinary Journal*, 201(1), 31-38. doi:<https://doi.org/10.1016/j.tvjl.2014.05.011>
- Fairweather, J. R., & Keating, N. C. (1994). Goals and management styles of New Zealand farmers. *Agricultural Systems*, 44(2), 181-200.
- Falconer, K. (2000). Farm-level constraints on agri-environmental scheme participation: a transactional perspective. *Journal of Rural Studies*, 16(3), 379-394. doi:[https://doi.org/10.1016/S0743-0167\(99\)00066-2](https://doi.org/10.1016/S0743-0167(99)00066-2)
- FAO (Producer). (2003). Development of a Framework for Good Agricultural Practices Retrieved from <ftp://ftp.fao.org/docrep/fao/meeting/006/y8704e.pdf>
- FAO, & IDF (Producer). (2011, 1st April 2016). Guide to good dairy farming practice.
- Farmar-Bowers, Q., & Lane, R. (2009). Understanding farmers' strategic decision-making processes and the implications for biodiversity conservation policy. *Journal of Environmental Management*, 90(2), 1135-1144. doi:<http://dx.doi.org/10.1016/j.jenvman.2008.05.002>
- Fearne, A. (1998). The evolution of partnerships in the meat supply chain: insights from the British beef industry. *Supply Chain Management: An International Journal*, 3(4), 214-231.
- Fearne, A., & Walters, R. (2004). The costs and benefits of farm assurance to livestock producers in England. *Final Report for the Meat and Livestock Commission*.
- Feather, P. M., & Amacher, G. S. (1994). Role of information in the adoption of best management practices for water quality improvement. *Agricultural Economics*, 11(2-3), 159-170.
- Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behavior: The reasoned action approach*: Taylor & Francis.
- Flint, D. J., & Golobic, S. L. (2009). Searching for competitive advantage through sustainability: A qualitative study in the New Zealand wine industry. *International Journal of Physical Distribution & Logistics Management*, 39(10), 841-860. doi:doi:10.1108/09600030911011441
- Flores-Miyamoto, A., Reij, M. W., & Velthuis, A. G. J. (2014). Do farm audits improve milk quality? *Journal of Dairy Science*, 97(1), 1-9. doi:10.3168/jds.2012-6228
- Foot, K., & Joy, M. (2014). *The true cost of milk: Environmental deterioration Vs. profit in the New Zealand dairy industry*. Paper presented at the 2014 Conference, August 28-29, 2014, Nelson, New Zealand.

- Forman, J., & Damschroder, L. (2007). Qualitative content analysis *Empirical methods for bioethics: A primer* (pp. 39-62): Emerald Group Publishing Limited.
- Fraser, P., Ridler, B., & Anderson, W. (2014). The intensification of the NZ dairy industry: Ferrari cows being run on two-stroke fuel on a road to nowhere? *New Zealand Agricultural Resource Economics Society (NZARES)*) Available at <http://purl.umn.edu/187491> [Verified 8 February 2017].
- Galletta, A. (2013). *Mastering the semi-structured interview and beyond: From research design to analysis and publication*: NYU press.
- Garforth, C., Rehman, T., McKemey, K., Tranter, R., Cooke, R., Yates, C., . . . Dorward, P. (2004). Improving the design of knowledge transfer strategies by understanding farmer attitudes and behaviour. *Journal of Farm Management*, 12(1), 17-32.
- Gibbs, S. (2010). *Dairy lameness in the South Island*. Paper presented at the Proc. of the 4th Australasian Dairy Science Symposium, Lincoln University, Canterbury, New Zealand.
- Giovannucci, D., & Ponte, S. (2005). Standards as a new form of social contract? Sustainability initiatives in the coffee industry. *Food Policy*, 30(3), 284-301.
- Gloy, B. A., Hyde, J., & LaDue, E. L. (2016). Dairy Farm Management and Long-Term Farm Financial Performance. *Agricultural and Resource Economics Review*, 31(2), 233-247. doi:10.1017/S1068280500004032
- González, A. A., & Nigh, R. (2005). Smallholder participation and certification of organic farm products in Mexico. *Journal of Rural Studies*, 21(4), 449-460. doi:<https://doi.org/10.1016/j.jrurstud.2005.08.004>
- Green, L. E., Hedges, V. J., Schukken, Y. H., Blowey, R. W., & Packington, A. J. (2002). The Impact of Clinical Lameness on the Milk Yield of Dairy Cows. *Journal of Dairy Science*, 85(9), 2250-2256. doi:[https://doi.org/10.3168/jds.S0022-0302\(02\)74304-X](https://doi.org/10.3168/jds.S0022-0302(02)74304-X)
- Greer, G. (2013). *Initial Cost-Benefit Analysis of the Synlait Lead with Pride (LEAD) Programme*. Retrieved from
- Greiner, R., Patterson, L., & Miller, O. (2009). Motivations, risk perceptions and adoption of conservation practices by farmers. *Agricultural Systems*, 99(2-3), 86-104. doi:<http://dx.doi.org/10.1016/j.agsy.2008.10.003>
- Grisham, E., & Gillespie, J. (2007). *Record-keeping technology adoption in the Louisiana dairy industry*. Paper presented at the SAEA annual meeting, Mobile, AL.
- Guerin, L., & Guerin, T. (1994). Constraints to the adoption of innovations in agricultural research and environmental management: a review. *Australian Journal of Experimental Agriculture*, 34(4), 549-571. doi:<https://doi.org/10.1071/EA9940549>
- Guler, I., Guillen, M. F., & Macpherson, J. M. (2002). Global Competition, Institutions, and the Diffusion of Organizational Practices: The International Spread of ISO 9000 Quality Certificates. *Administrative Science Quarterly*, 47(2), 207-232. doi:10.2307/3094804

- Haggerty, J., Campbell, H., & Morris, C. (2009). Keeping the stress off the sheep? Agricultural intensification, neoliberalism, and 'good' farming in New Zealand. *Geoforum*, 40(5), 767-777. doi:<http://dx.doi.org/10.1016/j.geoforum.2008.12.003>
- Halasa, T., Huijps, K., Østerås, O., & Hogeveen, H. (2007). Economic effects of bovine mastitis and mastitis management: A review. *Veterinary quarterly*, 29(1), 18-31.
- Hansson, H., Ferguson, R., & Olofsson, C. (2012). Psychological Constructs Underlying Farmers' Decisions to Diversify or Specialise their Businesses – An Application of Theory of Planned Behaviour. *Journal of Agricultural Economics*, 63(2), 465-482. doi:10.1111/j.1477-9552.2012.00344.x
- Henson, S., & Humphrey, J. (2010). Understanding the Complexities of Private Standards in Global Agri-Food Chains as They Impact Developing Countries. *The Journal of Development Studies*, 46(9), 1628.
- Higgins, V., Dibden, J., & Cocklin, C. (2008). Building alternative agri-food networks: Certification, embeddedness and agri-environmental governance. *Journal of Rural Studies*, 24(1), 15-27. doi:<https://doi.org/10.1016/j.jrurstud.2007.06.002>
- Hobbs, J. (2002). *Incentives for the Adoption of Good Agricultural Practices (GAPs)*. Paper presented at the FAO consultation on Good Agricultural Practices, Rome.
- Hobbs, J., Fearn, A., & Spriggs, J. (2002). Incentive structures for food safety and quality assurance: an international comparison. *Food Control*, 13(2), 77-81. doi:[https://doi.org/10.1016/S0956-7135\(01\)00103-7](https://doi.org/10.1016/S0956-7135(01)00103-7)
- Holleran, E., Bredahl, M. E., & Zaiet, L. (1999). Private incentives for adopting food safety and quality assurance. *Food Policy*, 24(6), 669-683. doi:[http://dx.doi.org/10.1016/S0306-9192\(99\)00071-8](http://dx.doi.org/10.1016/S0306-9192(99)00071-8)
- Huijps, K., Lam, T. J., & Hogeveen, H. (2008). Costs of mastitis: facts and perception. *Journal of Dairy Research*, 75(1), 113-120.
- Hyland, J. J., Heanue, K., McKillop, J., & Micha, E. (2018). Factors underlying farmers' intentions to adopt best practices: The case of paddock based grazing systems. *Agricultural Systems*, 162, 97-106. doi:<https://doi.org/10.1016/j.agry.2018.01.023>
- Ingram, J., Gaskell, P., Mills, J., & Short, C. (2013). Incorporating agri-environment schemes into farm development pathways: A temporal analysis of farmer motivations. *Land Use Policy*, 31, 267-279. doi:<http://dx.doi.org/10.1016/j.landusepol.2012.07.007>
- International Organization for Standardisation. (2017). About ISO. Retrieved from <https://www.iso.org/about-us.html>
- Jay, M. (2007). The political economy of a productivist agriculture: New Zealand dairy discourses. *Food Policy*, 32(2), 266-279. doi:<http://dx.doi.org/10.1016/j.foodpol.2006.09.002>
- Karapetrovic, S., & Willborn, W. (2000). Quality assurance and effectiveness of audit systems. *International Journal of Quality & Reliability Management*, 17(6), 679-703.

- Khanna, M. (2001). Non-Mandatory Approaches to Environmental Protection. *Journal of Economic Surveys*, 15(3), 291-324. doi:10.1111/1467-6419.00141
- Kirwan, J. (2006). The interpersonal world of direct marketing: examining conventions of quality at UK farmers' markets. *Journal of Rural Studies*, 22(3), 301-312.
- Kossaibati, M., & Esslemont, R. (1997). The costs of production diseases in dairy herds in England. *The Veterinary Journal*, 154(1), 41-51.
- Läpple, D., Renwick, A., & Thorne, F. (2015). Measuring and understanding the drivers of agricultural innovation: Evidence from Ireland. *Food Policy*, 51, 1-8.
doi:<https://doi.org/10.1016/j.foodpol.2014.11.003>
- Lawrence, J. D. (2002). Quality Assurance "Down Under": Market Access and Product Differentiation.
- Leat, P., Marr, P., & Ritchie, C. (1998). Quality assurance and traceability - the Scottish agri-food industry's quest for competitive advantage. *Supply Chain Management: An International Journal*, 3(3), 115-117. doi:doi:10.1108/EUM00000000004534
- Leviston, Z., Price, J., & Bates, L. (2011). Key influences on the adoption of improved land management practice in rural Australia: The role of attitudes, values and situation. *Rural Society*, 20(2), 142-159.
- Lewis, K. A., Tzilivakis, J., Green, A., Warner, D., & Coles, A. (2008). Farm assurance schemes: can they improve farming standards? *British Food Journal*, 110(11), 1088-1105.
doi:<http://dx.doi.org/10.1108/00070700810918009>
- Lewis, T. (1998). Evolution of farm management information systems. *Computers and Electronics in Agriculture*, 19(3), 233-248. doi:[https://doi.org/10.1016/S0168-1699\(97\)00040-9](https://doi.org/10.1016/S0168-1699(97)00040-9)
- Logan, T. J. (1990). Agricultural best management practices and groundwater protection. *Journal of Soil and Water Conservation*, 45(2), 201-206.
- Love, P. E. D., & Li, H. (2000). Overcoming the problems associated with quality certification. *Construction Management and Economics*, 18(2), 139-149. doi:10.1080/014461900370771
- Lundblad, J. P. (2003). A review and critique of Rogers' diffusion of innovation theory as it applies to organizations. *Organization Development Journal*, 21(4), 50-64.
- Macdonald, T. O. (2014). *The financial costs of environmental compliance through reducing nitrate leaching for a range of Waikato dairy farm system intensities*. (Master of Management Studies (MMS) Masters), University of Waikato, Hamilton, New Zealand. Retrieved from <https://hdl.handle.net/10289/9212>
- MacLeod, C. J., & Moller, H. (2006). Intensification and diversification of New Zealand agriculture since 1960: An evaluation of current indicators of land use change. *Agriculture, Ecosystems & Environment*, 115(1-4), 201-218. doi:<https://doi.org/10.1016/j.agee.2006.01.003>
- Main, D., Mullan, S., Atkinson, C., Cooper, M., Wrathall, J., & Blokhuis, H. (2014). Best practice framework for animal welfare certification schemes. *Trends in Food Science & Technology*, 37(2), 127-136. doi:<https://doi.org/10.1016/j.tifs.2014.03.009>

- Main, D., Webster, A., & Green, L. (2001). Animal welfare assessment in farm assurance schemes. *Acta Agriculturae Scandinavica, Section A-Animal Science*, 51(S30), 108-113.
- Manderson, A. K., Mackay, A. D., & Palmer, A. P. (2007). Environmental whole farm management plans: Their character, diversity, and use as agri-environmental indicators in New Zealand. *Journal of Environmental Management*, 82(3), 319-331. doi:<https://doi.org/10.1016/j.jenvman.2005.05.020>
- Manning, L., Baines, R. N., & Chadd, S. A. (2006). Quality assurance models in the food supply chain. *British Food Journal*, 108(2/3), 91-104.
- Marra, M., Pannell, D. J., & Abadi Ghadim, A. (2003). The economics of risk, uncertainty and learning in the adoption of new agricultural technologies: where are we on the learning curve? *Agricultural Systems*, 75(2), 215-234. doi:[https://doi.org/10.1016/S0308-521X\(02\)00066-5](https://doi.org/10.1016/S0308-521X(02)00066-5)
- Maxwell, J. A. (2010). Using numbers in qualitative research. *Qualitative inquiry*, 16(6), 475-482.
- McEachern, M., & Warnaby, G. G. (2005). Improving customer orientation within the fresh meat supply chain: A focus on assurance schemes. *Journal of Marketing Management*, 21(1-2), 89-115.
- McGlone, J. J. (2001). Farm animal welfare in the context of other society issues: toward sustainable systems. *Livestock Production Science*, 72(1), 75-81. doi:[https://doi.org/10.1016/S0301-6226\(01\)00268-8](https://doi.org/10.1016/S0301-6226(01)00268-8)
- Miller, J. (2014). *Farmer adoption of best management practices using incentivized conservation programs*. The University of Vermont and State Agricultural College.
- Ministry for Primary Industries. (2017). Legislation. Retrieved from <https://www.mpi.govt.nz/about-mpi/legislation/>
- Moller, H., MacLeod, C. J., Haggerty, J., Rosin, C., Blackwell, G., Perley, C., . . . Gradwohl, M. (2008). Intensification of New Zealand agriculture: Implications for biodiversity. *New Zealand Journal of Agricultural Research*, 51(3), 253-263. doi:10.1080/00288230809510453
- More, S. (2009). Global trends in milk quality: implications for the Irish dairy industry. *Irish Veterinary Journal*, 62(4), S5. doi:10.1186/2046-0481-62-s4-s5
- Morris, C. (2000). Quality assurance schemes: A new way of delivering environmental benefits in food production? *Journal of Environmental Planning and Management*, 43(3), 443-448.
- Morris, J., Mills, J., & Crawford, I. M. (2000). Promoting farmer uptake of agri-environment schemes: the Countryside Stewardship Arable Options Scheme. *Land Use Policy*, 17(3), 241-254. doi:[https://doi.org/10.1016/S0264-8377\(00\)00021-1](https://doi.org/10.1016/S0264-8377(00)00021-1)
- Mugera, A. W., & Bitsch, V. (2005). Managing labor on dairy farms: a resource-based perspective with evidence from case studies. *International Food and Agribusiness Management Review*, 8(3), 79-98.

- Murphy, S. C., Martin, N. H., Barbano, D. M., & Wiedmann, M. (2016). Influence of raw milk quality on processed dairy products: How do raw milk quality test results relate to product quality and yield? *Journal of Dairy Science*, 99(12), 10128-10149. doi:<https://doi.org/10.3168/jds.2016-11172>
- Nada, S., Ilija, D., Igor, T., Jelena, M., & Ruzica, G. (2012). Implication of food safety measures on microbiological quality of raw and pasteurized milk. *Food Control*, 25(2), 728-731. doi:<https://doi.org/10.1016/j.foodcont.2011.12.022>
- Naveh, E., & Marcus, A. (2005). Achieving competitive advantage through implementing a replicable management standard: Installing and using ISO 9000. *Journal of Operations Management*, 24(1), 1-26.
- Neale, P., Thapa, S., & Boyce, C. (2006). *Preparing a Case Study: A Guide for Designing and Conducting a Case Study for Evaluation Input*: Pathfinder International.
- Nettle, R., Paine, M., & Petheram, J. (2006). Improving Employment Relationships: findings from learning interventions in farm employment. *New Zealand Journal of Employment Relations*, 31(1), 17.
- New Zealand Government. (2015). New Zealand Economic and Financial Overview 2015. Retrieved from <http://www.treasury.govt.nz/economy/overview/2015/nzefo-15.pdf>
- New Zealand Institute of Economic Research. (2017). Dairy trade's economic contribution to New Zealand Retrieved from https://nzier.org.nz/static/media/filer_public/29/33/29336237-3350-40ce-9933-a5a59d25bd31/dairy_economic_contribution_update_final_21_february_2017.pdf
- Nightingale, C., Dhuyvetter, K., Mitchell, R., & Schukken, Y. (2008). Influence of Variable Milk Quality Premiums on Observed Milk Quality. *Journal of Dairy Science*, 91(3), 1236-1244. doi:<https://doi.org/10.3168/jds.2007-0609>
- Nilsson, H., Tunçer, B., & Thidell, Å. (2004). The use of eco-labeling like initiatives on food products to promote quality assurance—is there enough credibility? *Journal of Cleaner Production*, 12(5), 517-526. doi:[https://doi.org/10.1016/S0959-6526\(03\)00114-8](https://doi.org/10.1016/S0959-6526(03)00114-8)
- Noe, E., & Alrøe, H. F. (2003). Farm enterprises as self-organising systems: a new transdisciplinary framework for studying farm enterprises? *International journal of sociology of agriculture and food*, 11(1), 3-14.
- Noordhuizen, J. P. T. M., & Metz, J. H. M. (2005). Quality control on dairy farms with emphasis on public health, food safety, animal health and welfare. *Livestock Production Science*, 94(1), 51-59. doi:<http://dx.doi.org/10.1016/j.livprodsci.2004.11.031>
- Northern, J. R. (2001). Using farm assurance schemes to signal food safety to multiple food retailers in the UK. *The International Food and Agribusiness Management Review*, 4(1), 37-50.
- Olynk, N. J., & Ortega, D. L. (2013). Consumer preferences for verified dairy cattle management practices in processed dairy products. *Food Control*, 30(1), 298-305. doi:<https://doi.org/10.1016/j.foodcont.2012.07.030>

- Pannell, D. J., Marshall, G. R., Barr, N., Curtis, A., Vanclay, F., & Wilkinson, R. (2006). Understanding and promoting adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture*, 46(11), 1407-1424.
- Patton, M. Q. (1990). *Qualitative Evaluation and Research Method*. Newbury Park, CA: Sage Publications Inc.
- Payne, M., Bruhn, C. M., Reed, B., Searce, A., & O'Donnell, J. (1999). On-Farm Quality Assurance Programs: A Survey of Producer and Industry Leader Opinions. *Journal of Dairy Science*, 82(10), 2224-2230. doi:[http://dx.doi.org/10.3168/jds.S0022-0302\(99\)75469-X](http://dx.doi.org/10.3168/jds.S0022-0302(99)75469-X)
- Penno, J. (1997). *Target liveweights for replacement heifers*. Paper presented at the Ruakura Farmers Conference.
- Petersen, B., & Snapp, S. (2015). What is sustainable intensification? Views from experts. *Land Use Policy*, 46(C), 1-10. doi:10.1016/j.landusepol.2015.02.002
- Primary ITO. (2018). Dairy Farming Courses. Retrieved from <https://www.primaryito.ac.nz/courses-for-your-team/dairy/dairy-farming/>
- Prokopy, L. S., Floress, K., Klotthor-Weinkauff, D., & Baumgart-Getz, A. (2008). Determinants of agricultural BMP adoption: Evidence from the literature *Journal of Soil and Water Conservation*, 63(5), 300-311. doi:10.2489/jswc.63.5.300
- Regmi, A. (2001). Changing structure of global food consumption and trade: an introduction. *Changing Structure of Global Food Consumption and Trade*. Anita Regmi, 1.
- Reimer, A. P., Weinkauff, D. K., & Prokopy, L. S. (2012). The influence of perceptions of practice characteristics: An examination of agricultural best management practice adoption in two Indiana watersheds. *Journal of Rural Studies*, 28(1), 118-128. doi:<http://dx.doi.org/10.1016/j.jrurstud.2011.09.005>
- Renzi, S., & Klobas, J. E. (2008). Using the Theory of Planned Behavior with qualitative research. St. Louis: Federal Reserve Bank of St Louis.
- Rigby, D., Woodhouse, P., Young, T., & Burton, M. (2001). Constructing a farm level indicator of sustainable agricultural practice. *Ecological Economics*, 39(3), 463-478. doi:[https://doi.org/10.1016/S0921-8009\(01\)00245-2](https://doi.org/10.1016/S0921-8009(01)00245-2)
- Rimal, R. N., & Real, K. (2003). Understanding the Influence of Perceived Norms on Behaviors. *Communication Theory*, 13(2), 184-203. doi:10.1111/j.1468-2885.2003.tb00288.x
- Rodrigues, A., & Ruegg, P. (2005). Actions and outcomes of Wisconsin dairy farms completing milk quality teams. *Journal of Dairy Science*, 88(7), 2672-2680.
- Rogers, E. M. (2003). *Diffusion of Innovations* (Fifth ed.). New York: Free Press.
- Rosin, C. (2008). The conventions of agri-environmental practice in New Zealand: farmers, retail driven audit schemes and a new spirit of farming. *GeoJournal*, 73(1), 45-54. doi:10.1007/s10708-008-9177-1

- Rosin, C., Hunt, L., Fairweather, J., & Campbell, H. (2007). Becoming the audited: response of New Zealand sheep/beef farmers to the introduction of supermarket initiated audit schemes.
- Rowley, J. (2002). Using case studies in research. *Management research news*, 25(1), 16-27.
- Rueda, X., & Lambin, E. F. (2013a). Linking Globalization to Local Land Uses: How Eco-Consumers and Gourmands are Changing the Colombian Coffee Landscapes. *World Development*, 41, 286-301. doi:<http://dx.doi.org/10.1016/j.worlddev.2012.05.018>
- Rueda, X., & Lambin, E. F. (2013b). Responding to Globalization: Impacts of Certification on Colombian Small-Scale Coffee Growers. *Ecology and Society*, 18(3). doi:10.5751/ES-05595-180321
- Schils, R. L. M., de Haan, M. H. A., Hemmer, J. G. A., van den Pol-van Dasselaar, A., de Boer, J. A., Evers, A. G., . . . Zom, R. L. G. (2007). DairyWise, A Whole-Farm Dairy Model. *Journal of Dairy Science*, 90(11), 5334-5346. doi:10.3168/jds.2006-842
- Schreier, M. (2012). *Qualitative content analysis in practice*: Sage Publications.
- Schroeder, L. A., Chaplin, S., & Isselstein, J. (2015). What influences farmers' acceptance of agri-environment schemes? An ex-post application of the 'Theory of Planned Behaviour' *Landbauforschung*, 65(1), 15-28
- Serra, T., Goodwin, B. K., & Featherstone, A. M. (2004). Determinants of investments in non-farm assets by farm households. *Agricultural Finance Review*, 64(1), 17-32.
- Shiferaw, B. A., Okello, J., & Reddy, R. V. (2009). Adoption and adaptation of natural resource management innovations in smallholder agriculture: reflections on key lessons and best practices. *Environment, Development and Sustainability*, 11(3), 601-619. doi:10.1007/s10668-007-9132-1
- Siebert, R., Toogood, M., & Knierim, A. (2006). Factors Affecting European Farmers' Participation in Biodiversity Policies. *Sociologia Ruralis*, 46(4), 318-340. doi:10.1111/j.1467-9523.2006.00420.x
- Small, B., Brown, P., & Montes de Oca Munguia, O. (2016). Values, trust, and management in New Zealand agriculture. *International Journal of Agricultural Sustainability*, 14(3), 282-306. doi:10.1080/14735903.2015.1111571
- Soderlund, R., Williams, R., & Mulligan, C. (2008). Effective adoption of agri-food assurance systems. *British Food Journal*, 110(8), 745-761.
- Spriggs, J., Hobbs, J. E., & Fearn, A. (1999). *Beef Producer Attitudes to Farm Assurance Schemes in Canada and the UK*. Paper presented at the World Food and Agribusiness Congress,, Florence, Italy.
- Struik, P. C., Kuyper, T. W., Brussaard, L., & Leeuwis, C. (2014). Deconstructing and unpacking scientific controversies in intensification and sustainability: why the tensions in concepts and values? *Current Opinion in Environmental Sustainability*, 8, 80-88. doi:<https://doi.org/10.1016/j.cosust.2014.10.002>

- Stup, R. E., Hyde, J., & Holden, L. A. (2006). Relationships Between Selected Human Resource Management Practices and Dairy Farm Performance. *Journal of Dairy Science*, 89(3), 1116-1120. doi:[https://doi.org/10.3168/jds.S0022-0302\(06\)72180-4](https://doi.org/10.3168/jds.S0022-0302(06)72180-4)
- Sulemana, I., & James, H. S. (2014). Farmer identity, ethical attitudes and environmental practices. *Ecological Economics*, 98, 49-61. doi:<https://doi.org/10.1016/j.ecolecon.2013.12.011>
- Sutherland, L.-A. (2010). Environmental grants and regulations in strategic farm business decision-making: A case study of attitudinal behaviour in Scotland. *Land Use Policy*, 27(2), 415-423. doi:<http://dx.doi.org/10.1016/j.landusepol.2009.06.003>
- Swaffield, S. (2014). Sustainability Practices in New Zealand Agricultural Landscapes under an Open Market Policy Regime. *Landscape Research*, 39(2), 190-204. doi:10.1080/01426397.2013.809058
- Synlait Milk Ltd. (2013). Lead with Pride. Retrieved from <http://www.synlait.com/site/uploads/2013/04/Lead-With-Pride-Brochure.pdf>
- Synlait Milk Ltd. (2016). Lead With Pride Complete Requirements (pp. 1-115).
- Synlait Milk Ltd. (2017a). Lead With Pride. Retrieved from <http://www.synlait.com/about/supplying-synlait/lead-with-pride/>
- Synlait Milk Ltd. (2017b). Our Story. Retrieved from <http://synlait.com/our-story/>
- Tauer, L. W. (2001). Efficiency and competitiveness of the small New York dairy farm. *Journal of Dairy Science*, 84(11), 2573-2576.
- Thomas, S., Bloomer, D., Martin, R., & Horrocks, A. (2006). Spray irrigation on dairy pastures - efficient or not? *Proceedings of the New Zealand Grassland Association*, 68, 177-181.
- Turner, D. W. (2010). Qualitative interview design: A practical guide for novice investigators. *The qualitative report*, 15(3), 754.
- Upton, J., Humphreys, J., Groot Koerkamp, P. W. G., French, P., Dillon, P., & De Boer, I. J. M. (2013). Energy demand on dairy farms in Ireland. *Journal of Dairy Science*, 96(10), 6489-6498. doi:<https://doi.org/10.3168/jds.2013-6874>
- Valeeva, N. I., Lam, T. J. G. M., & Hogeveen, H. (2007). Motivation of Dairy Farmers to Improve Mastitis Management. *Journal of Dairy Science*, 90(9), 4466-4477. doi:10.3168/jds.2007-0095
- Valentin, L., Bernardo, D. J., & Kastens, T. L. (2004). Testing the empirical relationship between best management practice adoption and farm profitability. *Review of Agricultural Economics*, 26(4), 489-504.
- Van der Waaij, E., Galesloot, P., & Garrick, D. (1997). Some relationships between weights of growing heifers and their subsequent lactation performances. *New Zealand Journal of Agricultural Research*, 40(1), 87-92.
- Veil, S. (2010). Adoption Barriers in a High-Risk Agricultural Environment. *International Journal of Technology and Human Interaction (IJTHI)*, 6(2), 30-46. doi:10.4018/jthi.2010040103

- Veissier, I., Butterworth, A., Bock, B., & Roe, E. (2008). European approaches to ensure good animal welfare. *Applied Animal Behaviour Science*, 113(4), 279-297.
- Verbeke, W. (2009). Stakeholder, citizen and consumer interests in farm animal welfare. *Animal Welfare*, 18(4), 325-333.
- Wall, E., Weersink, A., & Swanton, C. (2001). Agriculture and ISO 14000. *Food Policy*, 26(1), 35-48.
- Wang, Z., Mao, Y., & Gale, F. (2008). Chinese consumer demand for food safety attributes in milk products. *Food Policy*, 33(1), 27-36.
- Warnick, L., Janssen, D., Guard, C., & Gröhn, Y. (2001). The effect of lameness on milk production in dairy cows. *Journal of Dairy Science*, 84(9), 1988-1997.
- Wauters, E., Biielders, C., Poesen, J., Govers, G., & Mathijs, E. (2010). Adoption of soil conservation practices in Belgium: an examination of the theory of planned behaviour in the agri-environmental domain. *Land Use Policy*, 27(1), 86-94.
- Wejnert, B. (2002). Integrating models of diffusion of innovations: a conceptual framework. *Annual Review of Sociology*, 297+.
- Wood, J., Holder, J., & Main, D. (1998). Quality assurance schemes. *Meat Science*, 49, S191-S203.
- Worksafe New Zealand. (2017). Certified handler requirements, 1-8. Retrieved from <https://worksafe.govt.nz/topic-and-industry/hazardous-substances/certification-authorisation-approvals-and-licensing/certification-of-people/certified-handlers/>
- Wossink, G. A. A., & Osmond, D. L. (2002). Farm economics to support the design of cost-effective best management practice (BMP) programs to improve water quality: Nitrogen control in the Neuse River Basin, North Carolina. *Journal of Soil and Water Conservation*, 57(4), 213-220.
- Wren, M. (2018). Synlait Lead With Pride Environmental Best Practice Dairy Farming. *The Journal*, 22(1), 38-42.
- Wu, J., & Babcock, B. A. (1999). The relative efficiency of voluntary vs mandatory environmental regulations. *Journal of environmental economics and management*, 38(2), 158-175.
- Yin, R. K. (2003). *Case Study Research: Design and Methods*: SAGE Publications.
- Yiridoe, E. K. (2000). Risk of public disclosure in environmental farm plan programs: Characteristics and mitigating legal and policy strategies. *Journal of Agricultural and Environmental Ethics*, 13(1), 101-120. doi:10.1007/bf02694138
- Young, C. W., Eidman, V. R., & Reneau, J. K. (1985). Animal Health and Management and Their Impact on Economic Efficiency¹. *Journal of Dairy Science*, 68(6), 1593-1602. doi:[https://doi.org/10.3168/jds.S0022-0302\(85\)80998-X](https://doi.org/10.3168/jds.S0022-0302(85)80998-X)
- Yzer, M. (2012). Perceived Behavioral Control in Reasoned Action Theory:A Dual-Aspect Interpretation. *The ANNALS of the American Academy of Political and Social Science*, 640(1), 101-117. doi:10.1177/0002716211423500

Appendix 1 Interview Schedule Certified Suppliers

Interview Schedule

Background Questions

- Tell me about your involvement in agriculture:
 - Explain Background
 - Education
 - Previous Jobs (e.g. Rural Consultant or Sheep & Beef, Cropping)
 - Length of time dairy farming
 - Always supplied Synlait
 - Role on current farm (Owner, Manager, 2IC)
- Tell me about your farm here:
 - Farm Size – Total & Effective Hectares
 - Profitable
 - Ownership Structure (Corporate Farm, 50:50 Sharemilker, Contract Milk)
 - Peak Cow Numbers
 - Shed Type
 - Number of Staff
 - Production
 - A part of Special Milk program (A2, Grass Fed)

Motivations – Inform RAA Model

Relative Advantage

- What are the advantages of being LWP Accredited?
 - Premiums
 - Better quality farm
 - Better procedures
 - SOPs
 - Sustainable business
 - Social prestige
 - Proactive to industry requirements – removes uncertainty about compliance issues
 - Exclusive supplier events
 - Milk Supply Engagement
- What are the disadvantages of being LWP Accredited?
 - Associated costs
 - Time required
 - Stress of audits

- Why are quality assurance programs important in the dairy industry?
 - Market Demand
 - Community Pressures
 - Environmental Sustainability
 - Animal Welfare
 - Food Quality
 - Staffing Issues
- If you shifted properties would you do LWP again?
 - Effort Required
 - Previous Experience

Complexity

- What were the difficulties with LWP implementation on your property?
 - Writing SOPs
 - Time Invested
 - Audit Process
 - Understanding program requirement
 - Computer skills
 - Maintaining records
 - Cost of implementation
 - Lack of knowledge on requirements – required assistance
 - Appropriate requirements – address relevant issues
- *Follow up question: Were these difficulties apparent before programme adoption?*
- What made implementation of LWP easier?
 - Assistance from other Synlait suppliers
 - Assistance from Synlait Milk supply team
 - Farm was already doing many of the requirements
 - Help in addressing compliance with regulations
 - Simplicity in what is required

Compatibility

- How did you find out about LWP?
 - Easy to sign up
 - Give much thought to joining?
- Did your farm meet many of the programme requirements prior to adoption?
 - *Follow up question: To what extent did you have to adjust your existing farm system to adopt LWP?*
 - Animal Welfare Practices

- Environmental Practices
 - Milk Quality Practice
 - Social Responsibility Procedures
 - Documentation
 - Records
 - Little Investment Required
- Looking back did you have a need for a farm assurance like the LWP program on your property?
 - Systems and processes
 - Outline all regulatory requirements into one programme (e.g. Health & Safety, employment rules, environmental regulation, animal health and welfare codes).
- Did you have confidence LWP would work on your property?
 - Being able to meet all the programme requirements
 - Likelihood of passing on audit day
 - All staff would be able to perform to programme requirements, e.g. Answering audit questions
 - Previously tried other innovations on farm – e.g. Trialed technologies

Observability

- Had you seen LWP in practice on another farm prior to adopting it here?
 - Worked on an LWP farm
 - Visited another supplier's farm
 - Attended LWP Shows Day
 - Advantages in attending – seeing LWP in practice, understanding the programme, talking to those who have been through the certification process
- What was the influence of other people's perception of adopting LWP?
 - Other Synlait suppliers disapproving those who won't adopt
 - Pressure amongst wider farming community
 - Pressure from general public
 - More suppliers being certified
 - Pressure from Synlait

Trialability

- Would an audit prior to adoption (to see where you currently sat) have helped?
 - Trialing where farm sits currently
 - Understanding of exactly what would be required to meet certification
 - Trialing the audit process

- Better understanding of the certification process
- Would the ability to adopt one pillar at a time over an extended time period influence your decision to adopt the programme/have made programme implementation easier?
 - Only have to do one audit at a time
 - Smaller workload
 - Focused approach
 -

Risk

- What risks does adoption of LWP pose to your business?
 - Invested Capital
 - Failing audit
 - Premium stops being paid
 - Becomes an expectation of all suppliers
 - Become tied to supplying Synlait

Appendix 2 Interview Schedule Non-certified suppliers

Background Questions

- Tell me about your involvement in agriculture:
 - Explain Background
 - Education
 - Previous Jobs (eg. Rural Consultant or Sheep & Beef, Cropping)
 - Length of time dairy farming
 - Always supplied Synlait
 - Role on current farm (Owner, Manager, 2IC)
- Tell me about your farm here:
 - Farm Size – Total & Effective Hectares
 - Profitable
 - Ownership Structure (Corporate Farm, 50:50 Sharemilker, Contract Milk)
 - Peak Cow Numbers
 - Shed Type
 - Number of Staff
 - Production
 - Apart of Special Milk program (A2, Grass Fed)

Motivations – Inform RAA Model

Relative Advantage

- What would be the advantages of being LWP Accredited?
 - Premiums
 - Better quality farm
 - Better procedures
 - SOPs
 - Sustainable business
 - Social prestige
 - Proactive to industry requirements – removes uncertainty of compliance issues
 - Exclusive supplier events
 - Milk Supply Engagement
- What would be the disadvantages of being LWP Accredited?
 - Associated costs
 - Time required
 - Stress of audits
- Why are quality assurance programs important in the dairy industry?
 - Market Demand
 - Community pressures

- Environmental Sustainability
- Animal Welfare
- Food Quality
- Staffing Issues

Complexity

- What would be the difficulties with LWP implementation on your property?
 - Writing SOPs
 - Time Invested
 - Audit Process
 - Understanding program requirement
 - Computer skills
 - Maintaining records
 - Cost of implementation
 - Lack of knowledge on requirements – required assistance
 - Appropriate requirements – address relevant issues
 - *Follow up question: Do you think the difficulties are made well apparent to you?*
- What would encourage implementation of LWP on your farm?
 - Assistance from other Synlait suppliers
 - Assistance from Synlait Milk supply team
 - Farm was already doing many of the requirements
 - Helps address compliance with regulations
 - Simplicity in what is required

Compatibility

- Do you think your farm meets many of the program requirements already?
 - *Follow up question: To what extent did you have to adjust your existing farm system to adopt LWP?*
 - Animal Welfare Practices
 - Environmental Practices
 - Milk Quality Practice
 - Social Responsibility Procedures
 - Documentation
 - Records
 - Little Investment Required
- Do you have a need for a farm assurance program like the LWP program on your property?
 - Systems and processes

- Outline all regulatory requirements in to one program (eg. Health & Safety, employment rules, environmental regulation, animal health and welfare codes).
- Do you have confidence LWP would work on your property?
 - Being able to meet all the program requirements
 - Likelihood of passing on audit day
 - All staff would be able to perform to program requirements eg. Answering audit questions
 - Previously tried other innovations on farm – eg. Tried technologies

Observability

- Had you seen LWP in practice on another farm?
 - Worked on a LWP farm
 - Visited another suppliers farm
 - Attended LWP Shows Day
 - Advantages in attending – seeing LWP in practice, understanding the program, talking to those who have been through certification process
- What would be the influence of other peoples perception to adopt LWP?
 - Other Synlait suppliers disapproving those who wont adopt
 - Pressure amongst wider farming community
 - Pressure from general public
 - More suppliers being certified
 - Pressure from Synlait

Trialability

- Would an audit prior to adoption (to see where you currently sat) help?
 - Trialing where farm sits currents
 - Understand exactly what would be required to meet certification
 - Trial the audit process
 - Better understand the certification process
- Would the ability to adopt one pillar at a time over an extended time period influence your decision to adopt the program?
 - Only have to do one audit at a time
 - Smaller workload
 - Focused approach

Risk

- What risks would adoption of LWP pose to your business?
 - Invested Capital
 - Failing audit

- Premium stops being paid
- Becomes an expectation of all suppliers
- Become tied to supplying Synlait

Appendix 3 Overview of Complete Requirements

OVERVIEW

The requirements are the means by which you can achieve certification for Lead With Pride™ and they are organised into four key pillars:

- Social Responsibility
- Environment
- Animal Health and Welfare
- Milk Quality




Lead With Pride™ is designed to be outcome based enabling you to design systems that suit your own operation as long as mandatory requirements are met. In order to assist in the development of on-farm systems there are templates available for documented procedures, recording systems and training records that can be used as a guide. These templates are available as Lead With Pride™ **Standard Operating Procedures (SOPs)** and **Supporting Documents**.

A Lead With Pride™ Records Book has been provided. This (or an equivalent way to make records in hard copy or electronically) can be used as the basis for record keeping.

How to Read the Requirements

This template outlines the requirements that must be met by suppliers to become Lead With Pride™ certified. The following document consists of three main areas:

Required Outcome = This is the outcome that must be achieved.

BEST DAIRY FARMING PRACTICE	EVIDENCE OF COMPLIANCE
 These "Best Dairy Farming Practices" are suggested methods of how to reach the required outcome.	In order to demonstrate that required outcomes have been met evidence is required.
 Mandatory practices are indicated by the blue arrow.  Recommendations can be included at the discretion of the participant as indicated by the green box.	This may consist of staff demonstrating their knowledge (e.g. when questioned), a review of written or electronic records and reality checks.

If you already have existing procedures that do not include these mandatory aspects you must amend these to ensure the mandatory practices are included.

For each required outcome there are a number of practices that are outlined in the column 'Best Dairy Farming Practice'. As the participant these practices are what you need to be able to demonstrate. In order to demonstrate that you meet the requirements you must have systems and processes in place that enable this outcome to be achieved - including on-farm procedures, staff training and monitoring systems.

Appendix 4 Categorisation of Environmental Lead with Pride Requirements

Complete Requirements Reference #	Complete Requirements - Required Outcome	Mandatory/Quantifiable/Non-Quantifiable	Measurement / Reference	Data Source
Water				
EP 2.1	<i>To comply with all resource consents or water supply requirements relating to the taking and using of water.</i>	Mandatory	Resource Management Act 1991	N/A
EP 2.2	<i>To optimise water use efficiency</i>	Mandatory	Industry Agreed Good Management Practice - Irrigation and water use	N/A
EP 2.3	<i>To ensure at least one staff member is fully trained in the operation and maintenance of the irrigation system.</i>	Quantifiable	Irrigation NZ Course Cost	Irrigation NZ Website
EP 2.4	<i>To ensure an effective irrigation machinery maintenance system is in place.</i>	Quantifiable	Reduced breakdowns & Increased Efficiency	Farm Data & Literature
EP 2.5	<i>All water takes appropriately metered, unless exempt through irrigation scheme provisions.</i>	Mandatory	Resource Management (Measurement and Reporting of Water Takes) Regulations 2010	N/A
EP 2.6	<i>To ensure all new irrigation systems meet industry best practice.</i>	Non-Quantifiable	N/A	N/A
EP 2.7	<i>To ensure efficient water use on the farm.</i>	Mandatory	Industry Agreed Good Management Practice - Irrigation and water use	N/A
EP 2.7	<i>To ensure that existing irrigation systems aim to achieve good practice.</i>	Mandatory	Industry Agreed Good Management Practice - Irrigation and water use	N/A
Farm Waste				
EP 3.1	<i>To minimise solid waste produced from on-farm practices.</i>	Quantifiable	Reduced Rubbish disposal farm and rubbish disposal costs	Farm Data

EP 3.2	<i>To ensure animal carcasses are disposed of responsibly.</i>	Non-Quantifiable	N/A	N/A
Effluent Management				
EP 4.1	<i>To comply with all regional consent requirements relating to effluent management and discharge.</i>	Mandatory	Resource Management Act 1991	N/A
EP 4.2	<i>To develop and implement robust systems through the use of documented effluent procedures.</i>	Non-Quantifiable	N/A	N/A
EP 4.3	<i>To ensure at least one staff member is fully trained in the operation and maintenance of the effluent application system.</i>	Quantifiable	Primary ITO Effluent Course	Primary ITO Website
EP 4.4	<i>To implement an effective effluent equipment and machinery system.</i>	Quantifiable	Reduced breakdowns & Increased Efficiency	Farm Data
EP 4.5	<i>To install sufficient effluent storage for the farm operation.</i>	Non-Quantifiable	N/A	N/A
EP 4.6	<i>To minimise the volume of effluent produced.</i>	Non-Quantifiable	N/A	N/A
EP 4.7	<i>To ensure that the effluent system is fit for purpose.</i>	Quantifiable	Increased Efficiency, Cost of system evaluation	Farm Data & Literature
Chemicals				
EP 5.1	<i>To prevent site contamination from chemicals.</i>	Mandatory	Health and Safety at Work (Hazardous Substances) Regulations 2017	N/A
Nutrient Management				
EP 6.1	<i>To reduce soil and nutrient contamination of waterways.</i>	Mandatory	LWRP 5.68 - 5.71	N/A
EP 6.2	<i>To minimise nutrient application to surface and ground water through the use of nutrient budgeting.</i>	Mandatory	LWRP Schedule 7	N/A
EP 6.3	<i>To optimise nutrient use and minimise losses.</i>	Mandatory	LWRP 5.41 – 5.64	N/A
EP 6.4	<i>To optimise soil structure and soil biological activity.</i>	Mandatory	Industry Agreed Good Management Practice - Cultivation and soil structure	N/A
EP 6.5	<i>To optimise nitrogen management.</i>	Quantifiable	LWRP - 5.41 - 5.64 & Schedule 7	N/A

EP 6.6	<i>To optimise phosphate efficiency. Consider natural fertilisers.</i>	Quantifiable	LWRP 5.41 - 5.67 & Schedule 7	N/A
EP 6.7	<i>To ensure ground and surface water quality is maintained.</i>	Non-Quantifiable	N/A	N/A
Biodiversity				
EP 7.1	<i>Effective pest and weed management.</i>	Non-Quantifiable	N/A	N/A
EP 7.2	<i>Biodiversity enhancement.</i>	Quantifiable	Planting Costs	DairyNZ
Energy Management				
EP 8.1	<i>To minimise energy inputs for farm operating processes.</i>	Quantifiable	Reduced Fuel Usage	Farm Data
EP 8.1	<i>To mitigate Greenhouse gas emissions produced on-farm.</i>	Quantifiable	Reduced Power Usage	Farm Data

Appendix 5 Categorisation of Milk Quality Lead with Pride Requirements

Complete Requirements Reference #	Complete Requirements - Required Outcome	Mandatory/Quantifiable/Non-Quantifiable	Measurement / Reference	Data Source
Farm Dairy Presentation				
MP 2.1	<i>Acceptable presentation of the farm dairy and surrounds, at all times.</i>	Mandatory/Non-quantifiable	Synlait Supplier Handbook - Section 3	N/A
Milking Machine and Vat Hygiene				
MP 3.1	<i>To protect Milk Quality by ensuring milking machine and vat hygiene meets NZCP1 requirements at all times.</i>	Mandatory / Quantifiable	NZCP1 Part 6; Synlait Supplier Handbook - Section 3; Primary ITO MQ Course	Primary ITO Website
MP 3.2	<i>To ensure Milk Quality through adequate teat preparation.</i>	Non-quantifiable	N/A	N/A
Structures and Facilities				
MP 4.1	<i>To protect Milk Quality by ensuring farm dairy structures and facilities meet NZCP1 requirements at all times.</i>	Mandatory / Non-quantifiable	NZCP1 Part 3 & 4	N/A
MP 4.2	<i>To have a documented milking routine.</i>	Non-quantifiable	N/A	N/A
Milk Cooling and Filtering				
MP 5.1	<i>To protect Milk Quality by ensuring milk cooling and filtering exceeds NZCP1 requirements at all times.</i>	Mandatory Quantifiable	NZCP1 Part 5, 10 & 11; Synlait Supplier Handbook – Section 3; Reduced Temperature Grading	Synlait Production Data Records (MADCAP)
Residue Management				
MP 6.1	<i>To protect Milk Quality by ensuring that the management of residues meets the requirements of NZCP1.</i>	Mandatory / Quantifiable	Synlait Supplier Handbook – Section 4; Approved Handlers Certificate	Farm Data
MP 6.2	<i>To store, handle and use chemicals in a manner that reduces the risk of residue.</i>	Mandatory	NZCP1 Part 5	N/A

Management of Colostrum and Other Special Milks				
MP 7.1	<i>Colostrum shall be fit for purpose.</i>	Non-quantifiable	N/A	N/A
MP 7.2	<i>Special Milks are to be fit for purpose.</i>	Non-quantifiable	N/A	N/A

Appendix 6 Categorisation of Animal Health & Welfare Lead with Pride Requirements

Complete Requirements Reference #	Complete Requirements - Required Outcome	Mandatory/Quantifiable/Non-Quantifiable	Measurement / Reference	Data Source
Stockmanship				
AP 2.1	<i>To ensure all staff have sufficient knowledge and ability to maintain health and welfare of all stock - Stockmanship.</i>	Non-quantifiable	N/A	N/A
AP 2.2	<i>To ensure all staff have sufficient knowledge and ability to maintain health and welfare of all stock - Animal Welfare.</i>	Non-quantifiable	N/A	N/A
Feed and Water				
AP 3.1	<i>To meet the nutritional requirements for all stock.</i>	Quantifiable	kgMS at first lactation; 6 week in calf rate; weighing cost; vet cost; live weight target feed cost	Farm Data & Literature
AP 3.2	<i>To meet the nutritional requirements for all stock – Body Condition Score.</i>	Quantifiable	Impact of BCS on milk production; reproductive effects	Farm Data & Literature
AP 3.3	<i>To effectively manage feeding on-farm.</i>	Quantifiable	Impact of pasture production on milk production	Farm Data & Literature
AP 3.4	<i>To effectively manage feeding of calves.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 3	N/A
AP 3.5	<i>To meet the water requirements of all stock.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 3	N/A
The Physical Environment				
AP 4.1	<i>To provide adequate shelter to all stock.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 4	N/A
AP 4.2	<i>To adequately plan for and cope with extreme events.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 4	N/A
AP 4.3	<i>To provide safe and adequate farm facilities.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 4	N/A

AP 4.4	<i>To meet the health and welfare requirements of cows on stand-off areas, housing and feed pads.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 4	N/A
AP 4.5	<i>To meet health and welfare requirements of housed cows and calves.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 4	N/A
Husbandry Practices				
AP 5.1	<i>To handle stock in an acceptable and empathic manner at all times.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
AP 5.2	<i>To meet legislative requirements for droving while maintaining stock health and welfare.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5; Relevant Council Authorities	N/A
AP 5.3	<i>To meet legislative requirements for identification of stock.</i>	Non-quantifiable/mandatory	National Animal Identification and Tracing Act 2012;	N/A
AP 5.4	<i>To meet health and welfare requirements of lactating animals.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
AP 5.5	<i>To meet health and welfare requirements of cows to be dried off or culled.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
AP 5.6	<i>To meet health and welfare requirements of calving cows and heifers.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
AP 5.7	<i>To meet the health and welfare requirements of down or immobile cows.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
AP 5.8	<i>To manage calves in a manner that meets their health and welfare requirements and ensures empathic handling.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
AP 5.9	<i>To meet the health and welfare requirements of stock when selecting animals for mating.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A
	<i>To ensure pregnancy examinations are carried out in a safe and accurate manner.</i>	Non-quantifiable	N/A	N/A
AP 5.10	<i>To meet legislative requirements for painful husbandry procedures with a knowledgeable and preventative approach</i>	Non-quantifiable	N/A	N/A
AP 5.11	<i>To ensure pre-transport selection meets the health and welfare requirements of stock.</i>	Non-quantifiable/mandatory	Dairy Cattle Code of Welfare (2016) Part 5	N/A

AP 5.12	<i>To communicate issues identified by other regulatory bodies.</i>	Non-quantifiable/mandatory	Synlait Supply Conditions	N/A
Health				
AP 6.1	<i>To ensure inspection and treatment of stock is done effectively by competent personnel.</i>	Quantifiable/Mandatory	Cost of vet time required; Dairy Cattle Code of Welfare (2016) Part 6	Farm Data
AP 6.2	<i>To ensure a preventative approach to lameness is taken while meeting the health and welfare requirements of stock.</i>	Quantifiable	Reduced Lameness	Farm Data
AP 6.3	<i>To ensure a preventative Animal Health Plan is in use on-farm.</i>	Non-quantifiable/Mandatory	Dairy Cattle Code of Welfare (2016) Part 6	N/A
AP 6.4	<i>To ensure all calves receive prompt and effective care.</i>	Non-quantifiable	N/A	N/A
AP 6.5	<i>To ensure Emergency Humane Destruction/ Euthanasia is effectively used on-farm.</i>	Non-quantifiable/Mandatory	Dairy Cattle Code of Welfare (2016) Part 6	N/A
AP 6.6	<i>To reduce the spread of Johnes disease.</i>	Non-quantifiable	N/A	N/A
AP 6.7	<i>To ensure milk is fit for purpose at all times.</i>	Non-quantifiable/Mandatory	Synlait Supply Conditions	N/A
AP 6.8	<i>To ensure feed inputs are fit for purpose.</i>	Non-quantifiable	N/A	N/A
AP 6.9	<i>To ensure the use of inductions meets NZVA guidelines.</i>	Non-quantifiable	N/A	N/A

Appendix 7 Categorisation of Social Responsibility Lead with Pride Requirements

Complete Requirements Reference #	Complete Requirements - Required Outcome	Mandatory/Quantifiable/Non-Quantifiable	Measurement / Reference	Data Source
Recruitment Selection and Induction				
SP 2.1	<i>To have a robust recruitment process in place.</i>	Non-quantifiable	N/A	N/A
SP 2.2	<i>To ensure the fair treatment of applicants and legislative requirements are met for new employees.</i>	Non-quantifiable/Mandatory	Employment Relations Act 2000	N/A
SP 2.3	<i>To ensure the successful integration of staff through induction process.</i>	Non-quantifiable	N/A	N/A
Managing Staff				
SP 3.1	<i>To ensure accurate staff planning to maintain safe operation on-farm.</i>	Non-quantifiable	N/A	N/A
SP 3.2	<i>To meet immigration requirements.</i>	Non-quantifiable/Mandatory	Immigration Act 2009	N/A
SP 3.3	<i>To manage staff leave</i>	Non-quantifiable/Mandatory	Employment Relations Act 2000	N/A
SP 3.4	<i>To meet legislative remuneration requirements.</i>	Non-quantifiable/Mandatory	Employment Relations Act 2000	N/A
SP 3.5	<i>To effectively manage the 90 day trial period.</i>	Non-quantifiable/Mandatory	Employment Relations Act 2000	N/A
SP 3.6	<i>To adhere to the Disciplinary Process.</i>	Non-quantifiable/Mandatory	Employment Relations Act 2000	N/A
Training and Development				
SP 4.1	<i>To manage staff planning and development through a Training Matrix.</i>	Non-quantifiable	N/A	N/A
SP 4.2	<i>To manage and improve employee performance through a Performance and Learning Agreement.</i>	Non-quantifiable	N/A	N/A

SP 4.3	<i>To ensure consistency and excellence through Standard Operating Procedures (SOPs).</i>	Non-quantifiable	N/A	N/A
Health and Safety				
SP 5.1	<i>To ensure all hazards are identified and corrective action taken.</i>	Non-quantifiable	The Health and Safety at Work Act 2015	N/A
SP 5.2	<i>To safely manage Contractors on-farm.</i>	Non-quantifiable	The Health and Safety at Work Act 2015	N/A
SP 5.3	<i>To ensure all accidents are recorded and investigated.</i>	Non-quantifiable	The Health and Safety at Work Act 2015	N/A
SP 5.4	<i>To prepare for and effectively deal with emergency situations.</i>	Non-quantifiable	N/A	N/A
SP 5.5	<i>To ensure Chemicals and Hazardous Substances are managed safely on-farm.</i>	Non-quantifiable	The Health and Safety at Work Act 2015	N/A
SP 5.6	<i>To ensure that all Equipment and Machinery is safe and fit for purpose.</i>	Non-quantifiable	N/A	N/A
SP 5.7	<i>To ensure young people are kept safe in the workplace.</i>	Non-quantifiable	The Health and Safety at Work Act 2015	N/A
SP 5.8	<i>The farm is to maintain first aid capability through available staff member with first aid certificate.</i>	Quantifiable	Cost of first aid certification	Farm Data

Appendix 8 Lincoln University Human Ethics Committee Approval

Research Management Office

T 64 3 423 0817
PO Box 85084, Lincoln University
Lincoln 7647, Christchurch
New Zealand
www.lincoln.ac.nz

22 September 2017

Application No: 2017- 41

Title: Whole Farm System Assurance Scheme Adoption and Financial Return – A Case Study of Synlait Milks Lead With Pride Program

Applicant: R MacArthur

The Lincoln University Human Ethics Committee has reviewed the above noted application.
Thank you for your response to the questions which were forwarded to you on the Committee's behalf.

I am satisfied on the Committee's behalf that the issues of concern have been satisfactorily addressed. I am pleased to give final approval to your project.

Please note that this approval is valid for three years from today's date at which time you will need to reapply for renewal.

Once your field work has finished can you please advise the Human Ethics Secretary, Alison Hind, and confirm that you have complied with the terms of the ethical approval.

May I, on behalf of the Committee, wish you success in your research.

Yours sincerely



Grant Tavinor
Chair, Human Ethics Committee

PLEASE NOTE: The Human Ethics Committee has an audit process in place for applications. Please see 7.3 of the Human Ethics Committee Operating Procedures (ACHE) in the Lincoln University Policies and Procedures Manual for more information.